I. C. 6883 April 1936

DEPARTMENT OF THE INTERIOR

UNITED STATES BUREAU OF MINES
JOHN W. FINCH, DIRECTOR

INFORMATION CIRCULAR

PATENTS ON GEOPHYSICAL PROSPECTING ISSUED IN THE UNITED STATES, ENGLAND, CANADA, AUSTRALIA, GERMANY, FRANCE, AND RUSSIA

BY

W. AYVAZOGLOU

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PATENTS ON GEOPHYSICAL PROSPECTING ISSUED IN THE UNITED STATES, ENGLAND, CANADA, AUSTRALIA, GERMANY, FRANCE, AND RUSSIA[1]

By W. Ayvazoglou[2]

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[2] Principal translator, U.S. Bureau of Mines.

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INTRODUCTION

This information circular is issued because of the many inquiries regarding the construction of apparatus and methods of geophysical prospecting. There probably is no better way for students and those interested in this science to become acquainted with the background of this science than through the patent literature. Through it, as with a motion-picture camera, the gradual development and growth of these methods can be clearly observed. They often are a résumé of much tedious experimental work, of which only a small fraction is published in the scientific press.

The great variety of ideas extending in all directions is a great stimulant for testing some of the results. Often work commenced in this manner will lead into new and unsuspected channels, having economic value and scientific interest.

Most of the United States patents can be purchased for 10 cents from the U.S. Patent Office. Photostatic copies of foreign patents, except Russian, can also be obtained at that office.

Patent attorneys may find the list of patents an aid to their searches on this subject matter.

Citations in each group are arranged alphabetically, by authors. A dash at the beginning of a citation indicates the same author or authors as the preceding citation.

UNITED STATES PATENTS

1. Gravitational Methods

1. ANDRE, JOSEF (Rochester, N.Y.). Pendulum Apparatus. United States Patent 1858384, issued May 17, 1932.

Relates to methods of determining contour of subterranean strata or boundaries of geologic formations. Invention is incorporated in form of pendulum apparatus employing one or more pendulums, constructed and mounted in a novel manner so that their swinging movements may be minutely observed and accurately measured and necessary computations from observations and measurements made more accurately and quickly than heretofore.

Claims allowed - 25.

2. BERROTH, ALFRED (Potsdam, Berlin, Germany). Measuring Instrument for Investigating Gravitation. United States Patent 1927150, issued Sept. 17, 1933.

Applies to apparatus for determining variations in attractive force between masses, particularly in gravitational or magnetic attraction exerted on a body by earth due to fact that field of force in which body is situated varies.

Apparatus comprises elongated mass suspended by its two ends within a closed vessel; an upright wire connecting center of mass to means for applying adjustable torque on it to deflect it from its position of stable equilibrium into a position of unstable equilibrium; and means to determine variations in said state of unstable equilibrium when field of attraction to which mass is submitted is varied.

Claims allowed - 3.

3. BLAU, LUDWIG W. (Houston, Tex., assignor to Standard Oil Development Co.). Torsion Balance. United States Patent 1861229, issued May 31, 1932.

Comprises application to torsion balance of Kelvin bifilar suspension mirror instead of usual mirror at center of balance beam. Main objects of invention are to reduce time of reading and increase reliability of instrument by shortening time during which temperature changes or other disturbing causes may influence exactness of reading.

Claims allowed - 3.

4. _____ (of Houston, Tex., assignor to Standard Oil Development Company, a Corporation of Delaware). Apparatus for measuring relative values of gravity. United States Patent 1888976, issued Nov. 29, 1932.

This invention relates to an apparatus for measuring relative values of gravity comprising two bars attached to each other at their center at an angle, a beam, a pair of inextensible filaments for suspending the beam from one of the bars, a second pair of filaments, one end of each filament being connected to the second bar, means for yieldingly connecting the other end of the second pair of filaments to the beam and means for registering the rotational deflections of the beam due to changes in gravity.

Claims allowed - 12.

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5. DUNBAR, MALCOLM (London, England). Torsion Balance. United States Patent 1773032, issued Aug. 12, 1930.

Chiefly directed toward provision of more convenient optical indicating and registering system, an important feature of which is arrangement in the system of a fixed graduated index or scale, image of which is reflected by mirror on bar so that it can be read through a conveniently situated sight aperture furnished with a cross-wire or other datum mark. This arrangement enables direct readings of deviations of bar to be taken in numerical values; thus determination of readings by measurement of charts or diagrams is avoided.

Claims allowed - 12.

6. GORNICK, HUGO (Charlottenburg, Germany). Device for Measuring Slight Forces. United States Patent 1819089, issued Aug. 18, 1931.

Relates to a device for measuring slight forces by ascertaining torsion produced in a thread. Device consists of torsion thread, rigid scale system suspended by torsion thread, and balance beam and two weights in different horizontal planes, one of weights being placed above level of balance beam.

Claims allowed - 5.

7. HAALCK, HANS (Berlin-Steglitz, Germany, assignor to Exploration, Bodenuntersuchungs und Verwertungs G. m. b. H., Berlin, Germany). Torsion Balance. United States Patent 1868010, issued July 19, 1932.

Uses system which, like Eötvös arrangement, consists only of two beams, but has advantage that by two measurements horizontal gradients of gravity can be determined. Beams are not placed at angle of 180° to each other, as with Eötvös, but at angle of about 90°.

Claims allowed - 3.

8. _____ (Berlin-Steglitz, Germany). Torsion Balance for Measuring Differences of Gravity. United States Patent 1733407, issued Oct. 29, 1929.

Covers beam of such form as to simplify construction of whole apparatus and to afford convenient handling of instrument without disturbing its sensitiveness.

Claims allowed - 6.

9. HAMMER, RICHARD (Pittsburgh, Pa.). Gravity-Determining Device. United States Patent 1796150, issued Mar. 10, 1931.

Relates to apparatus for determining variations in force of gravity, including a mass, means for mounting mass for movement toward and away from earth in response to change in gravity force, means for generating alternating current of predetermined high frequency, including means for varying such frequency by movement of mass and means for measuring frequency as varied.

Claim allowed - 1.

10. HAYES, HARVEY C. (Washington, D.C.). Apparatus for Determining Force of Gravity at Sea. United States Patent 1792013, issued Feb. 10, 1931.

Improves and simplifies methods commonly employed for determination of the "gravitational constant" (g) and more specifically provides suitable apparatus for carrying out the method at sea, and devises a suitable gravity pendulum which will not be affected by rolling and pitching movement of a vessel at sea.

It is proposed to eliminate necessity for accurate chronometer by employing two pendulums in proximity to each other, one being of a type termed "standard", which is unaffected by variations in force of gravity, while second pendulum is of a type distinctly affected by such variations.

Claims allowed - 9.

11. HAYES, HARVEY C. Methods and Apparatus for Determining Gravity Variations. United States Patent 1787536, issued Jan. 6, 1931.

Refers particularly to determination of variations in gravity constant in its relation to geophysical exploration.

Present invention contemplates new and improved method which overcomes to a large extent objectionable feature of previously known methods and apparatus. Patent discloses use of plurality of simple pendulums to be set up at a series of points over an area to be explored and to be operated simultaneously, with provisions for forming a common photographic record of number of oscillations of all pendulums.

Claims allowed - 12.

12. _____ (of Washington, D.C.). Method and Apparatus for Determining the Force of Gravity. United States Patent 1995305, issued Mar. 26, 1935.

In apparatus of the class described, a vibratory string, a mass subject to the force of gravity for varying the tension and the natural frequency of said string, a piezo-electric crystal, means controlled by said string to alternately subject said crystal to pressure and relaxation in accordance with the vibrations of said string, and electrical means controlled by said crystal for driving the string at its natural frequency.

Claims allowed - 6.

13. _____ (of Washington, D.C.). Apparatus for Determining the Force of Gravity. United States Patent 2000948, issued May 14, 1935.

In apparatus for determining the gravitational constant at a desired point, a gravity sensitive pendulum located at said point, radio receiving devices adjacent to said pendulum and adapted to receive pendulum-controlled signals transmitted from a point at which the gravitational constant is known, means provided with an opening and controlled by said radio receiving devices, said pendulum being provided with an opening adapted to be alined with said first-mentioned opening, and means for determining when said openings are in alinement.

Claim allowed - 1.

14. JENNY, WILLY PAUL (Strasburg, Ohio, assignor to "Exploration" Boden-Untersuchungs und Verwertungs G. m. b. H., Hanover, Germany). Apparatus for Taking Geophysical Measurements by Means of Rotatable Balance. United States Patent 1791413, issued Feb. 3, 1931.

Relates to Eötvös balances and consists of adjustable stand for such a balance, with means for raising base plate supporting balance to uppermost measuring position, where base plate is rotated automatically, and for sinking plate afterward and rotating it automatically in one or more lower measuring stations.

Claims allowed - 3.

15. KILCHLING, KARL (Freiburg, Germany). Torsion Balance. United States Patent 1729836, issued Oct. 1, 1929.

Relates to improvements in torsion balance of Eötvös type. When making gravity measurements with a torsion balance of this type a fundamental requirement is very accurate vertical adjustment of the torsion axis. New arrangement and combination of parts render leveling superfluous, in that balance adjusts itself automatically.

Claims allowed - 8.

16. _____ Torsion Balance for Gravitational Measurements. United States Patent 1774516, issued Sept. 2, 1930.

Aims to reduce observation time required for a station, as well as to render circumstantial computation superfluous. Basic idea of method is to ascertain deflection of suspended attraction members not only in five azimuths, but in all, and in making it impossible to read directly direction and magnitude of gradient from numerical values and graphic representation of same after one preceding gaging of scale.

Claims allowed - 11.

17. KOENIGSBERGER, JOHANN (Freiburg, Germany). Measuring Instrument (Torsion Balance). United States Patent 1684229, issued Sept. 11, 1928.

Discloses damped system on torsion balance. Device consists of moving element in damping liquid with wire passing through center of liquid surface. Moving element consists of a plurality of disks, and wire supporting them is of small diameter.

Claims allowed - 4.

18. KOGBETLIANTZ, ERVAND (Paris, France). Three-Weighted Torsion Balance. United States Patent 1737660, issued Dec. 3, 1929.

Increases number of beams, thereby reducing the number of observations necessary in one point. As to construction of such a balance, it is entirely similar to usual Eötvös balance with two weights.

Claims allowed - 3.

19. MEISSER, OTTO (of Jena, Germany, assignor to the firm of Carl Zeiss, Jena, Germany). Pendulum for Gravity Determination. United States Patent 1987786, issued January 15, 1935.

A pendulum for gravity determination, comprising a pendulum body, a knife-edge attached to the pendulum body, and adjusting screws provided in the pendulum body, the axes of these adjusting screws lying in a plane containing the knife-edge. The pendulum is provided with a hollow portion in which a temperature-compensating body is inserted, the coefficient of expansion of this body being greater than that of the pendulum body, the lower end of this temperature-compensating body being fixed to the lower end of the pendulum body, and the upper end of the temperature-compensating body reaching approximately the center of gravity of the pendulum.

Claims allowed - 6.

20. MILLER, ROBERT H. (Houston, Tex.). Torsion Balance. United States Patent 1670310, issued May 22, 1928.

Discloses improvements in torsion balance by reducing time of oscillations by eddy-current damping in a hollow silver cylinder forming axial extension of torsion suspension. Suitable arrangements have been described for obtaining axial magnetic field from electromagnet.

Claims allowed - 10.

21. NICOLSON, ALEXANDER McLEAN (New York, N.Y., assignor to Communication Patents, Inc., New York., a Corporation of Delaware). Gravity Indicator, United States Patent 1975516, issued Oct. 2, 1934.

This invention relates to an apparatus for determining the value of gravity at any point comprising an oscillating circuit, a piezoelectric crystal located in said circuit for determining the frequency thereof, and means for adjusting said crystal in different planes with respect to a plane passing through the center of the earth, the difference in frequency of oscillations at said different positions indicating the value of gravity at said point.

Claims allowed - 10.

22. PEKAR, DESIDERIUS and RYBAR, STEPHEN (of Budapest, Hungary, said Rybar assignor to said Pekar). Eötvös Balance, United States Patent 1988508, issued Jan. 22, 1935.

Eötvös balance comprising a casing, a torsion beam suspended therein, deflecting bodies adjustably mounted therein next to said beam and fastening means to fix said bodies to one of the inner walls of said casing in a suitable position with respect to said beam. Each of said deflecting bodies comprises a substantially triangular base plate, two edges of which are covered, while the third edge is straight, and at least two sheet-metal walls extend perpendicular to said plate along said two curved edges, said third, straight edge upon each deflecting body being also disposed substantially parallel to the sides of said torsion beam.

Claims allowed - 3.

23. RYBAR, STEPHEN (Budapest, Hungary). Eötvös Torsion Balance. United States Patent 1617823, issued Feb. 15, 1927.

Describes method of reducing size of torsion balance by reducing torsion-wire diameter below 0.02 millimeter and beam and length of wire from size in normal balance of 40 and 50 centimeters, respectively, by cube root of fourth power of ratio between 0.02 millimeter and diameter of reduced wire, whereby sensitivity of balance remains unchanged.

Claim allowed - 1.

24. _____ Eötvös Torsion Balance. United States Patent 1829876, issued Nov. 3, 1931.

Relates to Eötvös torsion balance and has for its object to reduce considerably its height without decreasing sensitiveness of balance. An Eötvös torsion balance includes combination of pendulum arm with measuring wire suspended from arm, filament fixed to one end of pendulum arm, weight suspended from filament, weight fixed to other end of pendulum arm, mirror connected to pendulum arm, prism adapted to cooperate with mirror, light source for throwing light rays onto prism and mirror, and support for photographic plate below pendulum arm for receiving light rays projected by mirror through prism, light source and recording apparatus being arranged outside plane passing through pendulum arm.

Claim allowed - 1.

25. **SCHWEYDAR, WILHELM** (Potsdam, Berlin, Germany). Gravitation Meter for Measuring the Vertical Gradient of the Gravity of the Earth. United States Patent 1652255, issued Dec. 13, 1927.

Discloses method of measuring vertical gravity gradient by comparing bifilar turning moment with torsional component of helical spring. By adjusting position of counterpoise, two indications are made at different distances from earth's center.

Claims allowed - 3.

26. _____ Torsion Balance for Measuring Gravitation. United States Patent 1747651, issued Feb. 18, 1930.

Presents means by which balance beam is prevented from turning around its own axis, and by which vertical rods are prevented from tilting to one or other side.

Claims allowed - 7.

27. **SHAW, HERMAN** (London, England), **AND JONES, ERNEST LANCASTER** (Berkshire, England, assignors to Geophysical Research Corporation of New York, N.Y., a corporation of New Jersey). Torsion Balance and the Like. United States Patent 1843342, issued Feb. 2, 1932.

Relates more particularly to improvements in design and arrangement of torsion balances of type in which one portion of suspended system is maintained at definite vertical distance above or below other portions of that system, as, for example, in balances of Eötvös and similar types.

Relates further to improved arrangements in distribution of essential parts of any such suspended system and to improved arrangement and simultaneous operation of one or more such systems forming a complete instrument. Object of invention is to provide means for obtaining fewer settings of instrument than have hitherto been possible.

Claims allowed - 7.

28. **TRUMAN, ORLEY H.** (Houston, Tex. Assignor to Standard Oil Development Co.). Optical Torsion Balance. United States Patent 1963252, issued June 19, 1934.

This invention relates to an improvement upon previous forms of the Eötvös torsion balance. The author claims: In combination, a short-period torsion balance, including a torsion wire and a weighted bar suspended by the wire and having a short period, a mirror movable with the bar, a source of light, a compound microscope, and an optical system directing radiant energy from the source to the mirror and directing light reflected from the mirror upon the microscope throughout the period of the bar.

Claims allowed - 2.

29. _____ Gravity Meter. United States Patent 1988527, issued Jan. 22, 1935.

A gravity-measuring device comprising a weighted beam, a suspension for one end of the beam permitting free pivotal movement of the beam about a fixed axis in only a vertical direction, and means for normally balancing the other end of the beam against the force of gravity comprising a helical spring secured to the beam below said suspension and partly supporting the beam to oscillate about a position of equilibrium at a predetermined period whereby variations in the force of gravity on the beam vary the deflection of the beam, and means for reading the deflection of the beam.

Claims allowed - 5.

30. TRUMAN, ORLEY H. (of Houston, Tex. Assignor to Standard Oil Development Co., a Corporation of Delaware). Gravity Meter with Compensator. United States Patent 1998345, issued Apr. 16, 1935.

In a measuring device, a mass, a coil spring supporting the mass, vertically spaced unitary beam units each formed of superimposed layers of material having different coefficients of expansion, the adjoining layers of the beam units having the greater coefficients of expansion, one of the beam units supporting the spring at an intermediate portion of unit, another beam unit being supported at an intermediate portion, and members connecting the units spaced from their intermediate portions whereby expansion or contraction of the spring due to changes in temperature is compensated.

Claims allowed - 8.

31. WOLD, PETER IRVING (of Schenectady, N.Y.). Measurement of Gravitational Forces. United States Patent 1951226, issued March 13, 1934.

This invention relates to the measurement of gravitational forces and more particularly to the detection of small changes therein. The method of observing changes of acceleration due to gravity, which consists in obtaining a harmonic of a gravitational periodic system, and comparing the frequency of this harmonic with the frequency of a standard periodic system.

Claims allowed - 8.

32. WRIGHT, FREDERICK EUGENE (Washington, D.C., assignor to Carnegie Institution of Washington). Apparatus for the Measurement of the Variations in the Force of Gravity. United States Patent 1579273, issued Apr. 6, 1926.

Discloses method for direct determination of force of gravity or variations thereof by measuring torsion of two nonperiodic tapered helical suspensions. Very slight variations of gravity are measured by a three-image optical system embodied in design.

Claims allowed - 13.

2. Magnetic Methods

33. DUBILIER, WILLIAM (New Rochelle, N.Y., assignor to Dubilier Condenser Corporation, of New York, N.Y., a corporation of Delaware). Variometer. United States Patent 1861052, issued May 31, 1932.

Provides means and method for controlling tuning of a multistage radio receiver over very wide range, and with comparatively small quantity of apparatus, and material for constructing same. Invention comprises combination, with radio receiving set having appliances for detecting and amplifying oscillations, of plurality of devices for controlling said appliances, devices having form of coils with means for varying effective number of turns thereof, all coils being so mounted that said means can be operated in unison, and coils being disposed so that axis of each is perpendicular to axis of remainder.

Claims allowed - 4.

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34. HERRICK, HENRY N. (Berkeley, Calif., assignor to Standard Oil Co. of California, San Francisco, Calif., a corporation of Delaware). Method of and Apparatus for Determining Direction of Dip and Strike of Earth's Substrata. United States Patent 1792639, issued Feb. 17, 1931.

Relates to method and apparatus for determining direction of dip and strike of earth's substrata, more particularly to determination of magnetic properties of a sample taken from strata of which direction of the dip and strike are to be ascertained.

Important object of present invention is simplicity and reliability of methods and apparatus for determining dip and strike of earth's substrata from single borehole.

Claims allowed - 3.

35. _____ Measuring Instrument. United States Patent 1909619, issued May 16, 1933.

This invention relates to instruments of the type employed for measuring the intensity of the vertical component of the earth's magnetic field. This is a magnetic measuring instrument comprising a fixed support for a magnetic needle, a magnetic needle pivoted to swing freely in a vertical plane on said support, and a counterweight on the needle near one end of the same and below a line which passes through the center of gravity and is parallel to the longitudinal axis of said needle.

Claims allowed - 6.

36. JEWELL, DELL W. (Kalamazoo, Mich.). Prospector's Needle. United States Patent 961298, issued June 14, 1910.

Discloses balanced dip needle capable of being deflected in proximity of magnetic minerals. A circuit arrangement is provided for closing a contact and lighting a lamp upon deflection of needle, which also can be lowered into shafts and drillholes.

Claims allowed - 2.

37. RIEBER, FRANK (San Francisco, Calif., assignor to General Electric Co., a corporation of New York). United States Patent 1863415, issued June 14, 1932.

Relates to device that responds to magnetic fields and that can be used to measure direction and intensity of fields. In a magnetometer, a permeable member having such high permeability that a substantial amount of magnetism is induced therein by a magnetic field of substantial strength of earth's field, means mounting member in field under test so that magnetism is induced therein by field, and means for conducting current past face of member whereby a dynamic effect is obtained between current and magnetism induced in member by field.

Claims allowed - 14.

38. ROMAN, IRWIN (West Orange, N.J., assignor to Geophysical Research Corporation of New York, N.Y., a corporation of New Jersey). Method and Apparatus for Surveying Boreholes. United States Patent 1877593, issued Sept. 13, 1932.

Provides method and device for measuring straightness and degree of deviation from vertical of hole bored in ground. Method relates to surveying boreholes by use of two magnetic compasses definitely spaced above each other, recording relative positions of needles at one level, lowering two compasses a distance equivalent to distance between two compasses, and again recording relative position of the needles.

Claims allowed - 3.

39. ROUX, ERWIN (of Berlin-Friedenau, Germany, assignor to Askania Werke A. G. vormals Central Werkstatt Dessau und Carl Bamberg-Friedenau, a German Company). Magnetic Balance for the Measurements of Intensities. United States Patent 1976636, issued Oct. 9, 1934.

This invention relates to a magnetic balance comprising a casing, a balance body pivoted therein and provided with a mirror, and a telescope for observing the oscillations and the position of equilibrium of said balance body, said telescope comprising a tube, said tube being set into casing with its optical axis vertical and directed upon the mirror of the balance body, the tube containing transparent material having a scale thereon, arranged in the focal plane of the telescope objective, an eyepiece consisting of two collecting lenses, a plane-parallel glass plate arranged between the collecting lenses and inclined at an angle of 45° to the optical axis, there being an opening in the mounting of the eyepiece, laterally of the plane-parallel glass plate, and a lateral opening between the objective and the glass scale in the wall of the tube, a shaft rotatably supported in the tube opposite the opening, a mirror secured to the shaft within the tube, and means for turning the shaft into two positions, in one of which the mirror clears the path of light from the objective to the eyepiece and in the other of which the objective deflects rays passing through it through an angle of 90° and through the lateral opening.

Claims allowed - 12.

39a. _____ Magnetic Balance, United States Patent 2010245, issued Aug. 6, 1935.

A balance system for magnetic balances comprising, in combination, an oscillatory balance body and magnetic blades carried by said body, said balance body and said blades being of different material having substantially the same coefficient of expansion.

Claims allowed - 12.

40. SHIMIZU, SEIZO (Tokyo, Japan). Magnetometer. United States Patent 1819797, issued Aug. 18, 1931.

Concerns magnetometer for determining magnetic field for adjustment of magnetic compass, comprising coil of predetermined size through which current is passed to set up a magnetic field, means for measuring current through coil, a magnetic compass horizontally positioned in field of coil and provided with a vertically adjustable mounting rotatable about a vertical axis, and indicating means for determining several adjustments of compass.

Claims allowed - 2.

41. **SUNDBERG, KARL** (Stockholm, Sweden). Method and Apparatus for Magnetic Prospecting. United States Patent 1748659, issued Feb. 25, 1930.

Establishes artificial magnetic field in earth by use of direct current passing through a closed loop laid out on earth's surface; determinations are made by measurements with respect to said field.

Claims allowed - 5.

42. **TRUMAN, ORLEY H.** (Houston, Tex., assignor to Standard Oil Development Co., a corporation of Delaware). United States Patent 1943850, issued Jan. 16, 1934.

Relates to combination, in a magnetometer, of a magnet or magnets mounted on an elastic support, means for adjusting equilibrium position on this support, means for causing equilibrium to be stable on both sides of this position, means for altering restoring force so as to vary period of vibration about this position, means for damping this vibration, a mirror elastically connected to magnet or magnets so as to amplify extent of angular motion, and means for reading deflection of mirror.

Claims allowed - 14.

3. Seismic Methods

43. **ANDERSON, JOHN A.** (of Pasadena, Calif., assignor to Carnegie Institution of Washington, D.C.). Seismometer. United States Patent 1552186, issued Sept. 1, 1925.

This invention relates to a seismometer comprising a filament, means for placing it under tension lengthwise, a mass supported by the filament having substantial inertia and whose center of gravity is eccentric to the filament, and means controlled by the mass for causing indications of vibrations transmitted to the instrument.

Claims allowed - 11.

44. **BENIOFF, HUGO** (Pasadena, Calif., assignor to Carnegie Institution of Washington, Washington, D.C., a corporation). Electrical Recording Seismograph. United States Patent 1784415, issued Dec. 9, 1930.

Provides a seismograph whose response shall measure or be proportional to kinetic energy of earth particles or to that due to both positive and negative velocities of earth particles; another object is to provide necessary damping of seismometer pendulum by properly proportioning strength of main field and resistance of circuit, whereby additional damping means are unnecessary.

Claims allowed - 4.

45. **BLAU, LUDWIG; SLOTNICK, MORRIS M., AND STATHAM, LOUIS** (of Houston, Tex.), assignors to Standard Oil Development Company (a Corporation of Delaware). Compound Seismograph. United States Patent 2018756, issued Oct. 29, 1935.

In a seismograph, a frame, a mass, a helical spring for resiliently suspending the mass from the frame whereby seismic waves effect oscillation of the mass, an auxiliary mass, a helical spring for resiliently suspending the auxiliary mass from the first mentioned mass, and means for recording the relative movement between the auxiliary mass and the frame.

Claims allowed - 10.

46. BORN, WILLIAM T. (of Tulsa, Okla., assignor to Geophysical Research Corporation, New York, N.Y., a Corporation of New Jersey). Seismic Surveying. United States Patent 2003780, issued June 4, 1935.

The method of seismic surveying which comprises detonating a charge of explosive at a point near the earth's surface, receiving waves thus formed at a point near the shot point, impressing received waves on a recorder and rendering the recorder inoperative until after the direct waves have passed beyond the receiving point.

Claims allowed - 7.

47. BURG, KENNETH E., (Stafford, Kans., assignor to Geophysical Service, Inc., a Corporation of New Jersey). Method of Determining Geological Structure. United States Patent 1978668, issued Oct. 30, 1934.

This invention relates to a method of generating seismic waves below the ground water level in the earth for the purpose of making subsurface geological explorations, said method characterized by causing a generator of seismic waves to be placed below the ground water level in the earth and causing said generator to operate in conjunction with seismic recording apparatus, receiving and recording said seismic waves and observing the results secured therefrom.

Claims allowed - 2.

48. CADY, WALTER G. (Middletown, Conn.). Method of Maintaining Electric Currents of Constant Frequency. United States Patent 1472583, issued Oct. 30, 1923.

Covers use of crystal in vacuum-tube oscillator circuit for controlling frequency of circuit. Describes characteristic curves associated with this device.

Claims allowed - 3.

49. _____ Piezo-Electric Resonator. United States Patent 1450246, issued Apr. 3, 1923.

Discloses elemental reactions in electric circuit of piezoelectric crystal or resonator. Also describes simple oscillator valve circuit adjusted by crystal frequency.

Claims allowed - 6.

50. CALDWELL, GEORGE A. (Milton, Mass.), AND BIRCHALL, C. (Reading, Mass.). Sound-Locating Apparatus. United States Patent 1738094, issued Dec. 3, 1929.

Comprises pair of geophones connected by tubes or earpieces. Apparatus takes advantage of principle that ear recognizes direction from which sound comes. In using apparatus two geophones are moved about against surface through which vibrations are coming, until a point is found where sounds have same intensity in both ears. Direction in which sound comes will be perpendicular to a line connecting two geophones.

Claims allowed - 8.

51. CRANDALL, IRVING B. (East Orange, N.J., assignor to Western Electric Co.). United States Patent 1581334, issued Apr. 20, 1926.

Describes soft rubber diaphragm clamped at periphery, to which is attached a current-varying device. Sensitivity of apparatus should be maintained, irrespective of depth of immersion in water.

Claims allowed - 7.

52. DICKINSON, HOBART C. (Washington, D.C.). Vibration Analyzer. United States Patent 1591612, issued July 6, 1926.

Discloses method of photographically recording vibrations from a gimbally-mounted mirror. Certain planes of vibration may be directed through gimbal supports and thereby eliminated. A method for increasing intensity of illumination for photographic registration is embodied in the patent.

Claims allowed - 16.

53. DIGBY, W. P. (of London, England), BEATTY, P. W. (of Bahia Blanca, Argentina), AND HUSKINSON, A. C. (of Barnes, England). Means for Measuring, Indicating, and Recording Vibrations. United States Patent 1082014, issued Dec. 23, 1913.

Shows method of using liquid surface in conjunction with a reflector for recording vibrations. Mirror floats on surface of liquid, and provisions are made for photographic registration. Method was intended for measuring vibrations in machines.

Claims allowed - 9.

54. DUDLEY, OSCAR E., AND LUCID, CON (Houston, Tex., assignors to The Texas Co., New York, N.Y., a corporation of Delaware). Method of Creating Artificial Seismic Waves. United States Patent 1943725, issued Jan. 16, 1934.

Relates to method of creating artificial, compressional earth waves, which comprises firing explosive charge in ground at depth of more than 30 feet in a tightly packed hole, this charge being insufficient to disrupt surface of earth from said depth, so that substantially the entire force of the explosion will be transmitted to earth.

Claims allowed - 3.

55. FAY, RICHARD D. (Nahant, Mass., assignor to Submarine Signal Co.). Means for Finding Direction. United States Patent 1619017, issued Mar. 1, 1927.

Discloses method of determining from what direction sounds are arriving. Three or more separate sound-receiving systems are employed, with a method of connecting to any two for minimum difference in phase. Three have a displacement in a plane at points of equilateral triangle.

Claims allowed - 8.

56. FESSENDEN, REGINALD A. (Newton, Mass., assignor to Submarine Signal Co.). Apparatus for Directive Signaling. United States Patent 1561441, issued Nov. 10, 1925.

Covers binaural method of determining direction of source of sound. Difference in phase may be equalized either electrically in two circuits or by turning two separate receivers about a common axis.

Claims allowed - 10.

57. _____ (Brookline, Mass., assignor to Submarine Signal Co.). Locating Enemy Gun Positions. United States Patent 1341795, issued June 1, 1920.

Patent discloses a predetermined disposition of a plurality of sonic receiving apparatus, locating by travel-time diagrams position of a gun. Same sounds are identified by oscillographic registration.

Claims allowed - 2.

58. **FESSENDEN, REGINALD A.** (Chestnut Hill, Mass.). Method and Apparatus for Determining Distance by Echo. United States Patent 1853119, issued Apr. 12, 1932.

Relates to method and apparatus for locating position of objects, particularly their distance and direction, by echo; it includes especially receipt of such echo by means of a flash of light in connection with a scale, whereby observations may be secured from which distance from a station to object to be located may be determined.

Claims allowed - 12.

59. _____ (Brookline, Mass., assignor to Submarine Signal Co.). Method and Apparatus for Locating Orebodies. United States Patent 1240328, issued Sept. 18, 1917.

Discloses method of locating orebodies by "sound inflection," that is, bending line of sound by refraction or reflection. Time-distance relation is the basis of observation, as well as direction of the sound.

Claims allowed - 2.

60. **FURBER, HENRY J., JR.** (Chicago, Ill.). Apparatus for Ascertaining the Relative Locations of Distant Points. United States Patent 1194376, issued Aug. 15, 1916.

Shows method of recording distance by difference of velocity in two mediums between two points. Two separate receivers are used in two media. Oscillographic recording is applied.

Claims allowed - 4.

61. _____ Method for Locating Sounds. United States Patent 1149976, issued Aug. 10, 1915.

Discloses method of determining source of sound from stations at different distances from each other. Uses oscillographic recording methods and single vibratory impulse as basis of comparison.

Claims allowed - 4.

62. **HAHNEMANN, WALTER, HECHT, HENRICH, AND NIELSON, BERNHARD** (assignors to Signal Gesellschaft, Kiel, Germany). Method and Arrangement of Directional Wave Reception and Emission. United States Patent 1662247, issued Mar. 13, 1928.

Patent discloses method of arrangement of receivers or senders for directive listening and sending. Arrangement for most effective spacing is described. Both left-and right-ear compensation by same receiver reduces minimum binaural base line. Receivers may be placed near sender, yet the sound of the sender does not reach the receiver.

Claims allowed - 5.

63. **HAYES, HARVEY C.** (Washington, D.C.). Apparatus for Determining Ranges by Means of Sound Waves. United States Patent 1593972, issued July 27, 1926.

Covers system made sensitive to echoes and insensitive to direct waves with continuous vibrations by selective spacing of odd half wave lengths between transmitter and receiver. Moreover, by use of plurality of transmitters and receivers, operating in phase opposition, direct wave action is reduced.

Claims allowed - 3.

64. HAYES, HARVEY C. (New London, Conn., assignor to Submarine Signal Co.). Determination of Wave-Energy Direction. United States Patent 1532108, issued Mar. 31, 1925.

Describes system of receivers arranged in circle. Binaural system connects to definite groups of these receivers. Provision is made for time lag in separate receivers and also for rotatable means of connecting to system of receivers to determine direction of wave.

Claims allowed - 4.

65. _____ (Washington, D.C.). Geophysical Method and Apparatus. United States Patent 1814444, issued July 14, 1931.

Has to do primarily with improvements in methods and apparatus depending upon elastic qualities of various types of earth structure. Method comprises generation of compressional waves below surface, and detection of such waves at a plurality of stations at virtually same time; some stations are arranged in substantially a straight line, and at least one station is located at a side of point where compressional waves are generated opposite those stations in a straight line.

Apparatus covered by this invention serves to detect and record compressional waves set up in earth's surface, including plurality of vibration detectors, a recorder having separate record controlling elements for each detector, and means for affecting one element to produce a record at instant of generation of waves.

Claims allowed - 11.

66. _____ Method and Apparatus for Sound Ranging. United States Patent 1900015, issued Mar. 7, 1933.

Relates to device for measuring distance and consists of means for generating one periodic series of sonic signals, means for generating a second periodic series of sonic signals so spaced in time relation to first series that signals of second series are generated only midway between signals of first series, means for projecting said first series of signals to an object, distance of which it is desired to know, means for receiving sonic signals reflected from said object and conveying them to a point of audition, means for conveying second series to point of audition, and means for correspondingly varying period of two series of signals and maintaining said midway relation whereby echoes of signals of first series reach said point of audition at same time as direct signals of the second series.

Claims allowed - 7.

67. _____ Method for Making Subterranean Surveys. United States Patent 1784439, issued December 9, 1930.

Is based upon phenomenon of variation in coefficients of absorption and reflection in accordance with frequencies of waves transmitted, as well as media of transmission of reflection.

Claims allowed - 9.

68. _____ (New London, Conn., assignor to Submarine Signal Co.). Method of Determining Distances. United States Patent 1483547, issued Feb. 12, 1924.

Discloses a method of depth-sounding by generating sound at a known position and determining at another known position angle of incidence reflected from bottom. Amount of shelving or slope of bottom can be determined from two sets of apparatus properly placed.

Claims allowed - 9.

69. HAYES, HARVEY C. (Washington, D.C.). Vibration Detector. United States Patent 1923088, issued Aug. 22, 1933.

Relates to apparatus for detecting vibrations produced in surface of earth, either in form of sound waves or of waves having a frequency outside of range of audibility. Apparatus has elongated casing adapted to be supported in earth vertically; a magnetic ring, secured therein horizontally; an armature, mounted within this ring and having pole pieces slightly spaced from ring and cooperating therewith, cooperating faces of ring and pole pieces being parallel and beveled at an acute angle with respect to longitudinal axis of caving coils on armature; means for electrically energizing coils to produce a flux between ring and pole pieces; means for supporting said armature and adapted to permit both longitudinal and transverse movement with respect to casing; and means for indicating variation in flux through said coils due to movements of either type.

Claims allowed - 3.

70. HORVATH, SEPP (Houston, Tex.). Seismograph. United States Patent 1842963, issued Jan. 26, 1932.

Relates to improvement in seismographs and recording mechanisms employed in locating geological structures. Involves use of instruments embodying electrical transfer of mechanical vibrations of ground into corresponding electrical alterations of conditions of electrical circuits. With electrical circuits of type used here very sensitive measurements of these mechanical vibrations can be had by means of high-frequency circuits.

Claims allowed - 9.

71. JONES, JOHN HUGH (Hastings, England). Seismograph and Applicable to Other Measuring Instruments. United States Patent 1774379, issued Aug. 26, 1930.

Relates to means for indicating or recording small displacements. According to invention, small displacements to be magnified are imparted to a magnetic element - for example, a thin iron strip of suitable shape - held suspended in a direction transverse to a rapidly distorting magnetic field, that is to say, a magnetic field value of which changes appreciably from point to point, so that lines of magnetic force are strongly curved. Arrangement is such that suspended elements will take up a position parallel or nearly parallel to tangent to line of force at any particular point; thus, if a small mirror is attached to suspended element and suspended element and source of field are moved relatively to each other there will be a rotation of mirror proportional to displacement of suspended element, provided displacement is small. Small displacements of suspended element otherwise undiscernible may thus be indicated or recorded.

Means described may be employed to record small earth movements imparted to a pendulum or seismograph of either horizontal or vertical type. It also may be employed in connection with a balance.

Claims allowed - 4.

72. KARCHER, JOHN CLARENCE (Montclair, N.J.). Determination of Subsurface Formations. United States Patent 1843725, issued Feb. 2, 1932.

Relates to methods of and apparatus for determining location and depth of geological formations and particularly to determining geological folding in these subsurface formations. In present method use is made of waves which are transmitted downward into earth more nearly vertically than heretofore and are directly reflected from subsurface layer in question to earth's surface to a point which is usually a distance from source substantially less than depth of subsurface formation.

Claims allowed - 11.

73. _____ (assignor to Geophysics Research Corporation, of New York, N.Y., a corporation of New Jersey). Method and Apparatus for Locating Geological Formations. United States Patent 1706066, issued Mar. 19, 1929.

Discloses system using radio wave, air wave, and ground impulse simultaneously for determining geological structure; also a method of locating depth and slope by time of arrival of diffracted ground waves.

Claims allowed - 11.

74. KITHIL, KARL LUDWIG (of Denver, Colo.). Seismo-Vibrometer. United States Patent 1669135, issued May 8, 1928.

This invention relates to an apparatus consisting of a tubular casing having an open top and a window in one side, of a closure for the open top, an open frame carried by the top and removably located in the casing, said frame including a lower cross bar and spaced side bars, a torsional strand extending between the top and cross bar longitudinally in the casing and behind the window and between the side bars, a reflector carried by the strand behind the window, and a pendulum element carried by the strand and located within the casing, said pendulum having its center of mass at one side of the axis of the strand.

Claims allowed - 3.

75. _____ Seismo-Vibrometer. United States Patent 1672892, issued June 12, 1928.

This invention relates to an apparatus consisting of a casing forming a chamber and having a view opening in one of its side walls, of a torsional strand located longitudinally in the chamber and extending behind the view opening, a reflector secured to the strand and located behind the view opening, and a damping vane secured to the strand and located in the chamber at a lower point than the reflector, said chamber containing a damping liquid in its lower portion, said liquid being engaged by the vane, and said reflector being free from the damping liquid.

Claim allowed - 1.

76. KOENIGSBERGER, JOHANN G. (Freiburg, Germany). Method of Locating Salt or Rock Layers. United States Patent 1743353, issued Jan. 14, 1930.

Refers to method of determining situation and form of salt deposits, gravel and rock layers, and like. It is based on use of acoustic waves and electroacoustic apparatus to record these waves and makes use of modern sound-detecting apparatus, with or without amplifier tubes connected with oscillograph tubes or other recording devices, or without such, novel object as regards use of acoustic waves being locating of salt deposits, extension of boundaries of layers of gravel, and like.

Claims allowed - 4.

77. LANGEVIN, PAUL, AND FLORISSON, CHARLES LOUIS (Paris, France, assignors to Société de Condensation et d'Applications Mécaniques, Paris, France, a corporation of France). Method and Application for Sounding and for Locating Submarine Obstacles by Means of Ultra-Audible Waves. United States Patent 1858931, issued May 17, 1932.

Covers methods and apparatus for producing and receiving ultra-audible waves for accurate determination of distance of any submarine obstacle capable of reflecting ultra-audible waves.

Method consists in emitting, by means of piezo-electric apparatus, short signal consisting of set of ultra-audible waves, and in measuring time t between beginning of emission and beginning of reception of waves reflected from obstacle.

Claims allowed - 2.

78. MARTI, PIERRE AUGUSTE DANIEL (Philippeville, Algeria). Apparatus for Recording the Duration of Very Brief Phenomena. United States Patent 1613520, issued Jan. 4, 1927.

Discloses method of determining time interval of short duration by using a revolving element in conjunction with a contact point passing over a paper band. Adapted for continuous recording of sonic depths and for ultrasonorous apparatus of the Langevin type.

Claims allowed - 8.

79. McCOLLUM, BURTON (Washington, D.C., assignor to McCollum Geological Explorations, Inc., of Houston Tex., a corporation of Delaware). Method and Apparatus for Determining the Contour of Subterranean Strata. United States Patent 1672495, issued June 5, 1928, reissued as 17242, reissued Mar. 19, 1929.

Covers very comprehensive method of sonic exploration. Teaches how to overcome diffuse reflection by keeping horizontal distance of detecting device a short way from normal or vertical path of sound. To overcome differences in intensities of direct and reflected wave use of inverse square relation, shielding against direct impulse, and selective operation of two or more recorders are specified. Multiple-receiver system intensifying reflected wave is disclosed operating in a Wheat-stone-bridge circuit or coupled to common mutual induction. Special method of making contact with ground is described, and method of mounting recorder free from influence of waves other than desired ones is disclosed.

Claims allowed - 26.

80. McCOLLUM, BURTON (of Washington, D.C.). Method and Apparatus for Studying Geologic Contours. United States Patent 1675121, issued June 26, 1928.

This invention relates to the method of determining the contour of a subsurface stratum which comprises producing a train of sound waves at a distance above the surface of the earth, detecting the waves transmitted to and reflected from said stratum, varying the frequency of the sound waves to produce beats, and determining the depth of said stratum from the velocity of sound in the earth overlying said stratum and from the change in frequency required to produce said beats.

Claims allowed - 10.

81. _____ Method and Apparatus for Studying Geologic Contours. United States Patent 1676619, issued July 10, 1928.

This invention relates to the method of determining the slope of a subsurface rock layer which is overlaid by a layer of undisintegrated rocks covered in turn by an unconsolidated stratum, said method comprising the placing of a source of sound and a detector of sound waves down in the said overlying undisintegrated rock, in known positions relative to each other, sending sound waves out from the said source, giving rise to reflected waves from the boundary of the said subsurface rock, receiving the said reflected waves at the said detector, measuring the time interval elapsing between the sending out of the sound wave from the said source and the arrival of the reflected wave at the said detector, calculating the depth of the said subsurface rock from the said measured time interval, and the known velocity of sound in the said overlying rock layer, and the known positions of said sound source and detector.

Claims allowed - 5.

82. _____ Methods and Apparatus for Determining the Slope of Subsurface-Rock Boundaries. United States Patent 1724495, issued Aug. 13, 1929.

Specifies method of determining slope of subterranean boundaries by measuring time of arrival at plurality of points substantially equidistant in horizontal plane from a source of sound. Various paths and relative distances are discussed in detail.

Claims allowed - 9.

83. _____ Method and Apparatus for Studying Subsurface Contours. United States Patent 1724720, issued Aug. 13, 1929.

Covers method of overcoming uncertainty of slow speed of sound in weathered rocks or unconsolidated stratum relative to undisintegrated rocks by placing transmitter of energy or receiver of energy in separate strata at definite configurations.

Claims allowed - 5.

84. _____ (Houston, Tex., assignor to McCollum Geological Explorations, Inc., of Houston, Tex., a corporation of Delaware). United States Patent 1893970, issued Mar. 7, 1933.

Relates to seismic method of locating subterranean geologic formations, determining their depth, and profiling their surfaces. Method consists in originating plurality of seismic waves above said formation at spaced points, at times enabling individual waves to be reflected from said formation to arrive simultaneously at a common detecting point, recording time of origin of each separate wave, and recording simultaneous arrival of reflected waves.

Claims allowed - 8.

85. _____ (Houston, Tex., assignor, by mesne assignments, to The Texas Co., a corporation of Delaware). United States Patent 1909205, issued May 16, 1933.

Concerns art of determining shape of seismic wave fronts in a subterranean substance, method consisting in producing seismic waves, detecting arrivals of waves at points in a substantially vertical line therein, producing seismic waves to pass substantially vertically through said points, detecting arrivals of second mentioned waves at said points, and locating points on a wave front at time it reaches one of said points.

Claims allowed - 11.

86. _____ Seismic Method of Profiling Geologic Formations. United States Patent 1923107, issued Aug. 22, 1933.

Relates to seismic method of profiling boundary surfaces of subterranean geologic formations.

Method consists in producing a seismic wave in earth's substance, detecting arrival of wave at a point in earth's substance, producing a seismic wave above said point, and detecting arrival of second mentioned wave at two spaced points adjacent to first-mentioned point.

Claims allowed - 8.

87. McCOLLUM, ELTON V. (of Ponca City, Okla.) AND McGHEE, GEORGE C., (of Eunice, La., assignors to Continental Oil Co., Ponca City, Okla., a corporation of Delaware). Method of Making Dip Determinations of Geological Strata. United States Patent 2001429, issued May 14, 1935.

A method of determining the amount and direction of dip of buried geological strata including the steps of generating vibrations at spaced points below the weathered layer of the earth's surface, and receiving the vibrations after they have traveled through the earth at a point intermediate the vibration generating points.

Claims allowed - 2.

88. MINTROP, LUDGER (Hanover, Germany). Field Seismograph. United States Patent 1451080, issued Apr. 10, 1934.

Discloses oscillatably supported weight combined with a comparatively light-weighted lever, a rockingly supported mirror, a means for damping oscillations by oil or magnetically, and a source of light suitably arranged for registering photographically amount of relative motion of weight and supports. Complete system of stopping and release mechanism is also specified, as well as a return to same zero position.

Claims allowed - 11.

89. _____ (Bochum, Germany). Geological Testing Method. United States Patent 1599538, issued Sept. 14, 1926.

Shows method of creating seismic disturbance and from it ascertaining "travel-time" curves. Using these curves as a basis it teaches how to detect change of structure from inflection points on these curves. Depth of travel of impulse as a function of distance, speed, and depth curves and their interpretation are described. Method for detailing by choosing proper location of explosive charge to points selected for recording is explained.

Claims allowed - 16.

90. O'BRIEN, THOMAS (Brooklyn, N.Y.). Seismograph. United States Patent 1095022, issued Apr. 28, 1914.

Discloses portable seismograph for recording vibrations of buildings, bridges, etc. Combines recording, by single pendulum, of vertical and horizontal vibrations independently of each other. Mechanical levers are used to amplify movements.

Claims allowed - 9.

91. OWEN, JOHN E. (of Bloomfield, N.J., assignor to Geophysical Research Corporation, New York, N.Y., a Corporation of New Jersey). Method for surveying subsurface formations. United States Patent 1959004, issued May 15, 1934.

This invention relates to the method of exploring geological formations which comprises creating a source of seismic waves at the earth's surface, receiving direct and reflected waves by seismometers located at different distances from said source and making a record of the difference between the effects produced by waves received by the seismometers after first bringing into zero phase difference relation those effects due to the direct seismic waves.

Claims allowed - 15.

92. _____ Seismic Surveying. United States Patent 2018737, issued Oct. 29, 1935.

This invention relates to the method of seismic surveying which comprises successively producing artificial seismic waves at points in the immediate vicinity of each other in the earth's surface, successively receiving the waves thus produced at a common distant point in the earth's surface, independently recording the received waves and subsequently combining a plurality of individual records thus obtained into a composite record by algebraically adding the corresponding instantaneous amplitudes of said individual records.

Claims allowed - 4.

93. PETTY, OLIVE SCOTT (San Antonio, Tex.). Instrument for Detecting Vibrations. United States Patent 1864214, issued June 21, 1932.

Relates to instrument adapted for use in applied geophysics; more particularly to detect or record sound waves produced in earth and air by detonation of charges of explosives to obtain data or records which may be studied to determine underlying geological formations. Instrument for use as seismograph comprises thermionic vacuum tube with one element thereof serving as a pendulum steady mass movable in only one plane, and external means for damping relative movement of tube and steady mass.

Claims allowed - 8.

94. PRESCOTT, HAROLD R. (of Ponca City, Okla., assignor to Continental Oil Co., Ponca City, Okla., a Corporation of Delaware). Method of Making Geological Explorations. United States Patent 1998412, issued April 15, 1935.

A method of making geophysical explorations including the step of exploding a substantially vertical series of spaced explosive charges in succession.

Claims allowed - 4.

95. RIEBER, FRANK (San Francisco, Calif.). Method and Means for Geological Explorations. United States Patent 1827371, issued Oct. 13, 1931.

Relates to application of elastic pressure waves generated at earth's surface by aid of explosions. Main object of this invention consists of eliminating disturbing waves, thus securing stronger response of receiving system to pressure waves than to disturbing waves due to surface disturbances. Invention concerns receiver most sensitive to abrupt variations.

Claims allowed - 13.

96. _____. System and Method for Geophysical Exploration. United States Patent 1782445, issued Nov. 25, 1930.

Proposes: (1) to make it possible to obtain readily interpretable data from artificially produced shocks; (2) to make it possible to obtain complete data with relatively few detonations; (3) to provide system for geophysical explorations, which yields extreme accuracy; and (4) to provide such a system, the operation of which is affected by minimum number of uncontrollable factors that enter into plotting of results obtained. Means for accomplishment of objects are explained.

Claims allowed - 3.

97. ROSAIRE, ESME EUGENE (Fort Worth, Tex., assignor to Geophysical Research Corporation, New York, N.Y., a corporation of New Jersey). Method of Determining the Straightness of Drillholes in the Earth. United States Patent 1811648, issued June 23, 1931.

Covers method of determining deviation from vertical of bore formed in earth and comprises production of sound waves at different points on earth's surface and recording of the time intervals required by sound waves to travel from each of points to a selected place in bore below surface of earth and calculating position of points from recorded time intervals, known distance of surface points from mouth of bore, and known distance of selected points from mouth of bore.

Claims allowed - 7.

98. SCHÜTTE, JOHANN (Bremerhaven, Germany). Instrument for Recording and Measuring Vibrations. United States Patent 859123, issued July 2, 1907.

Covers method of utilizing gyroscope in place of pendulum for recording oscillations. Various lever arrangements and recording methods are described.

Claims allowed - 2.

99. SHRADER, JAMES EDMOND (Drexel Hill, Pa.). Device for Measuring and Recording Vibrations in Three Directions Simultaneously. United States Patent 1869328, issued Aug. 2, 1932.

Provides apparatus to show amplitude, frequency, wave form, and phase relations in three dimensions simultaneously.

Apparatus embodying features of invention employs seismograph principle of relative motion between a heavy mass and frame from which it is supported by system of springs. This motion is multiplied by changing linear displacement of frame, which moves with vibrating body into angular displacement of beam of light, which is reflected from mirror mounted on moving system.

Claims allowed - 4.

100. SNELLING, WALTER O., AND RUPP, GUY A. (Allentown, Pa., assignors to Trojan Powder Co., New York, N.Y., a corporation of New York). Seismometer. United States Patent 1825554, issued Sept. 29, 1931.

Covers seismometer so constructed that active indicating elements are not affected by violent air wave produced by blast. Invention further resides in certain novel features of construction facilitating operation of setting up apparatus.

Claims allowed - 7.

101. STANTON, AUSTIN N. (Iowa City, Iowa). Method of Seismological Research. United States Patent 1790080, issued Jan. 27, 1931.

Discloses improvements in method of seismological research by which depth is calculated directly from frequency. Method involves device, called a "geo-oscillator", to create, periodically, strong pressure on surface of earth, frequency of which can be varied from time to time; and resonance indicator which records consequent movement of earth's surface at same or near-by point.

Claims allowed - 7.

102. SUTHERLAND, JOHN (Seattle, Wash.). Echo - Distance Meter. United States Patent 796540, issued Aug. 8, 1905.

Treats method of recording distance directly, using sound and echo thereof. It is partly manually operated, but contains very many important details embodied in claims useful to this art.

Claims allowed - 13.

103. TAYLOR, HENRY GORDON (Beaumont, Tex., assignor to Geophysical Exploration Co., Beaumont, Tex., a corporation of Delaware). Method of Recording Seismic Waves. United States Patent 1799398, issued Apr. 7, 1931.

Relates to method for ascertaining presence, depth, shape, and disposition of subsurface strata and other geologic structure.

General object of this invention is to provide a method by which a reflected wave is recorded more strongly on a seismogram, and by which other waves are partly or wholly eliminated from seismogram, making it thereby possible to measure with certainty time required for an artificially created seismic wave to travel from surface of earth down to reflecting discontinuity and back to surface, from which data distance to reflecting discontinuity may be computed.

Claims allowed - 25.

104. TAYLOR, HENRY GORDON (Beaumont, Tex., assignor to Geophysical Exploration Co., Beaumont, Tex., a corporation of Delaware). Seismometer. United States Patent 1789055, issued Jan. 13, 1931.

Provides novel thread suspension for free end of inertia mass, which makes possible conversion of vertical motion of inertia mass into a rotary motion so as to make such motion more readily adaptable to registration on a photographic film by means of a ray of light.

Claims allowed - 36.

105. TRUMAN, ORLEY H. (Houston, Tex., assignor to Standard Oil Development Co., a corporation of Delaware). Geophysical Exploration Method. United States Patent 1919917, issued July 25, 1933.

Relates to method of underground exploration by means of impulses passing in form of direct and reflected waves between sending and receiving stations. Improvement it presents comprises sending wave impulses from at least two stations differing in distance from each other by substantially half wave length in upper layer of earth's surface, whereby direct waves from stations are caused to arrive at receiving station in opposite phase and cancel each other, and recording waves reflected from subsurface orebodies or like, such waves arriving in substantially same phase.

Claims allowed - 2.

106. _____ Underground Exploration Method. United States Patent 1878029, issued Sept. 20, 1932.

Applies to method of underground exploration which seeks to detect and locate underground structures by elastic waves reflected from them, waves being sent down from surface by explosions. Method relates to improvement which comprises sending out a train of waves, receiving waves at plurality of spaced stations, recording indications at each station in a form which will indicate time interval between waves of each wave train arriving at several stations, computing wave velocities from time intervals so determined and known distances between stations, and from resulting data determining angle of emergence of waves reflected from underground structure.

Claims allowed - 3.

107. TURNER, EDWIN E. JR. (of West Roxbury, Mass., assignor to Submarine Signal Company, Boston, Mass., a Corporation of Maine). Distance and Depth Finding. United States Patent 2009459, issued July 30, 1935.

In a system for measuring depths by the echo method in which periodically repeated sound signals are produced at close intervals of time, a sound-receiving system including a sound receiver, a valve-receiving system means in the anode-cathode circuit adapted to give a continuous indication which varies as a function of grid potential, means providing a potential varying in intensity with the depth being measured and means for impressing on said control grid periodically said potential as a varying bias, said last mentioned means being operated by the sound receiver to impress the said potential upon the control grid upon the receipt of the sound impulse by the sound receiver.

Claims allowed - 11.

108. TURNER, EDWIN E. JR. (of West Roxbury, Mass., assignor to Submarine Signal Company, Boston, Mass., a corporation of Maine). Means for Measuring Depths or Distances. United States Patent 2009460, issued July 30, 1935.

An apparatus for measuring depths or distances, comprising a sound producer of the impact types, a sound receiver tuned to the frequency corresponding to the vibration of the first half cycle of the sound producer and means for measuring the time interval between the production of the impact signal and the receipt of the echo.

Claim allowed - 1.

109. WHEELER, LEWIS R. (Tacoma, Wash.). Device for Registering Vibration of Musical Sounds. United States Patent 844836, issued Feb. 19, 1907.

Discloses method of sound registration, using carbon-button microphone. Balanced-torque method of equilibrium position is used on the pointer, in combination with inductorium.

Claims allowed - 3.

110. WILLIAMS, ROBERT LONGFELLOW (of Newton, Mass., assignor to Submarine Signal Co., Boston, Mass., a corporation of Maine). Method and Apparatus for Measuring Distances and Depths. United States Patent 2015702, issued Oct. 1, 1935.

This invention relates to a system for measuring distance or depth according to the echo method in which the time interval is measured between an emitted sound signal and its reflection or echo, the combination of a sound signal producer, a time-measuring device having a movable member, means for setting said member in motion at the beginning of the time interval and prior thereto restraining it from motion including electromagnetic means, and a contact relay positioned to be operated directly by the direct signal impulse and, when operated, to deenergize said electromagnetic means, whereby said member will be released abruptly at the beginning of said time interval.

Claims allowed - 4.

4. Electrical Methods

111. AMBRONN, RICHARD (Göttingen, Germany). Method of and Apparatus for Electric Earth Exploration. United States Patent 1897688, issued Feb. 14, 1933.

Concerns method of electric earth exploration which comprises generating alternating current within range of very low frequencies that has minimum value equal to maximum frequency of natural earth currents and has a maximum value equal to minimum frequency effective to produce elliptical polarization, transmitting said alternating current of very low frequency into earth by means of circuit comprising electrodes embedded in ground at two spaced points, and observing effect of said current in earth by means of electrical measuring instrument tuned to low frequency of said current.

Claims allowed - 6.

112. AMBRONN, RICHARD (Göttingen, Germany). Method of Exploring the Subsoil. United States Patent 1805900, issued May 19, 1931.

Discloses method of exploring subsoil, comprising feeding it with alternating current under control of form of oscillation ellipses of field produced thereby and measuring field of ground currents. For this purpose at least two current systems of like frequency and with phase displaced with respect to each other are excited in ground. By suitable correlation of such current system within field of investigation polarized electrical current field produced thereby can be made approximately circular.

Claims allowed - 5.

113. _____ Process of and Device for Detecting and Measuring Minimum Accelerations. United States Patent 1936321, issued Nov. 21, 1933.

Related to means of detecting and measuring minute accelerations, comprising a contact piece on a spring balance and another contact piece on a beam balance, or connection between these contact pieces and a suitable electric circuit, and a measuring means inserted in said circuit.

Claims allowed - 3.

114. BAKER, REUBEN C. (of Coalinga, California, assignor to Baker Oil Tools, Inc. of Huntington Park, California, a corporation of California). Formation Direction Indicator. United States Patent 1793894, issued Feb. 24, 1931.

This invention relates to the art of mineral oil mining and particularly pertains to that step in this art which is the determining by geological structure, formations favorable to the accumulation of mineral oil deposits. The device comprising in combination with a core barrel having an exterior drill barrel and an interior core tube, of a casing slidably mounted within the core tube, a magnetic needle within the casing, a telescopic connection between the casing and the upper end of the core tube whereby the casing may vertically reciprocate within the core tube, spaced prongs projecting downwardly from the lower end of the casing for penetration into the end of a core to be taken and remaining relatively fixed with relation thereto, the spacing between said prongs being unequal, means operative by certain relative movements between the core tube and the casing for latching the needle in an indicating position whereby it may be relatively fixed to the core.

Claims allowed - 4.

115. BIELER, ETIENNE SAMUEL, AND WATSON, HORACE GEORGE ISBISTER (Montreal, Canada). Apparatus for Use in Discovering and Determining Ore Bodies. United States Patent 1794666, issued Mar. 3, 1931.

Provides two flat coils of wire permanently fixed at right angles to each other, which may be tilted and turned in any desired direction to obtain desired information relative to the location of any orebody in vicinity.

Claims allowed - 3.

116. BILLOTE, LOUIS C. (Revere, Mass.), AND LIPSON, EDWARD (Chelsea, Mass., assignors to Oil Finding Corporation, a corporation of Delaware). Method of and Apparatus for Locating Deposits of Oil, Gas, and Other Dielectric Subterranean Bodies. United States Patent 1808397, issued June 2, 1931.

Related to improved method and apparatus for uses in location of deposits of oil and gas; it may also be used in locating other subterranean deposits having relatively high dielectric characteristics compared with the surrounding medium.

Invention is based on fact that when a current of relatively high frequency is permitted to enter earth through spaced electrodes, observed effect is different when a deposit of a high dielectric nature, such as oil or gas, lies beneath electrodes than when such deposit is not present.

Claims allowed - 14.

117. BLAU, LUDWIG W. (Houston, Tex., assignor to Standard Oil Development Co., a corporation of Delaware). Method and Apparatus for Geophysical Exploration. United States Patent 1911137, issued May 23, 1933.

Covers improvements in methods and apparatus for determining presence of valuable minerals, oil, and other subterranean deposits. Invention comprises use of direct electrical current passing between electrodes embedded in surface of earth. Characteristics of this current as modified by its passage through intervening strata are measured and recorded at a plurality of points.

Claims allowed - 7.

118. BROWN, FRED H., (of Boulder, Colo.). Apparatus for Detecting Mineral Ores. United States Patent 274882, issued Mar. 27, 1883.

This invention relates to apparatus for detecting and locating mineral ore by electricity. The apparatus consists of a battery, induction coil, wires having bare copper points, dumb-bell-shaped handles having guard plates, and casing having shoulder straps and pockets. By placing the points against a mineral, they will indicate the presence of metal by electric spark passing from the points toward the mineral instead of from one to another, and by having a sufficiently strong current the presence of metal may be determined in large bodies of minerals by holding one point against the rock and passing the other point over its surface, the wire point emitting sparks when finding metallic ore.

Claim allowed - 1.

119. _____ Apparatus for Detaching Mineral Ores. United States Patent 274883, issued Mar. 27, 1883.

Describes an induction coil operated by batteries. Secondary consists of two exploring wires with suitably insulated handles. Passage of a spark at wire points indicates presence of ore conductor.

Claim allowed - 1.

120. _____ (Chicago, Ill.). Process of Locating Metallic Minerals or Buried Treasures. United States Patent 645910, issued Mar. 20, 1900.

Discloses process for resistivity between various portions of earth. Presence of natural earth currents as disturbing element in direct-current resistance bridge measurement are discussed; alternating current is substituted for direct current.

Claims allowed - 2.

121. BROWN, FRED H., (Chicago, Ill.). Process of Locating Metallic Minerals. United States Patent 672309, issued Apr. 16, 1901.

Applies to method of measuring resistance between stakes by superimposing electrical impulse upon previously steady current in Wheatstone-bridge circuit.

Claims allowed - 7.

122. _____ Apparatus for Detecting and Locating Metallic Ores, Minerals, etc. United States Patent 689849, issued Dec. 31, 1901.

This invention relates to an apparatus for locating ores or metals in the earth, the combination with circuit terminals independent of and freely movable with respect to each other and adapted to be brought into contact with the earth at various and widely-separated points to close electric circuits which include the earth between such terminals, and means for measuring the resistance of the earth portions of said circuits, as and for the purpose set forth.

Claims allowed - 7.

123. _____ Electrical Process of Locating Running Water in the Earth. United States Patent 714775, issued Dec. 5, 1902.

Covers method of receiving vibrations set up in channels through which water passes. These vibrations are transformed to electric pulsations and into sound waves. Volume of sound over various sections are compared to each other.

Claim allowed - 1.

124. _____ (Los Angeles, Calif.). Apparatus for Locating Metals, Minerals, Buried Treasures, etc., without Digging. United States Patent 727077, issued May 5, 1903.

Includes wheatstone-bridge circuit attached to one ground terminal, other being movable. Current used is from a buzzer supply, and low resistance indicates presence of metal.

Claim allowed - 1.

125. _____ Electrical Apparatus for Determining the Location of Metallic Ores. United States Patent 817749, issued Apr. 17, 1906.

Discloses method of using variable current in bridge circuit, one arm of which is ground and other adjustable resistance for determining resistance between definite intervals on surface of ground between two electrodes.

Claims allowed - 4.

126. CARLSON, WENDELL E., AND HANSON, EARL C. (Washington, D.C.). Means for Locating Orebodies by Audio-Frequency Currents. United States Patent 1325554, issued Dec. 23, 1919.

Includes exploring coil forming arm in mutual induction bridge circuit balanced by resistance for disturbance in field of coil. Amplifying circuits and audiofrequency are used in system.

Claims allowed - 3.

127. CHAPMAN, F. S. (Greensburg, Ind.). Method of Detecting the Presence or Approximate Location of Metallic Masses. United States Patent 1564940, issued Dec. 8, 1925.

Discloses method of using variation of amplitude of ground wave from oscillating antenna and balancing strengths of currents in various directions against each other. Greater conductivity indicates presence of conductors.

Claims allowed - 5.

128. CHILSON, D. G. (Jerome, Ariz., assignor to the University of Arizona). Process of and Device for Locating Ore. United States Patent 1491900, issued Apr. 29, 1924.

Covers method for applying electrical contact to earth and other to known orebody and testing intensity of electromagnetic reaction adjacent to these points. High as well as low frequencies are illustrated in specification.

Claims allowed - 5.

129. CONKLIN, HARRY R. (Joplin, Mo.). Method and Apparatus for Determining Subterraneous Conductors. United States Patent 1241197, issued Sept. 25, 1927.

Includes exciting loop placed upon ground and supplied with high-frequency current from spark oscillator. Curves of equal magnetic intensities within this loop are determined by two exploring coils acting through a rectified circuit upon a direct current instrument. Contour of these lines is index to subterranean formations.

Claims allowed - 8.

130. DAFT, LEO, AND WILLIAM, ALFRED (Wimbledon, England). Apparatus for Detecting and Localizing Mineral Deposits. United States Patent 817736, issued Apr. 10, 1906.

Discloses method for mapping lines of a deposit by applying two electrodes to soil and proceeding along equipotential line with a resonant receiver. Lines of electric impulses concentrate over a medium of superior conductivity. An inductorium is used for a source of current. Sharp gradients are sought to indicate mineral deposits.

Claims allowed-7.

131. DAVIS, WALTER W. (Great Neck, N.Y.). Method of Detecting Ore Deposits. United States Patent 1724794, issued Aug. 13, 1929.

Covers method using Hertzian waves in subterranean transmission to locate ore by operating from one drift to another. Deflection of these waves from normal straight path indicates unhomogeneity.

Claims allowed - 4.

132. DEARDORFF, RALPH W. (Contra Costa County, Calif.). Electromagnetic Wave Explorer. United States Patent 1838371, issued Dec. 29, 1931.

Relates to locating of mineral deposits, such as oil or ores, by aid of directional transmission and detection of electromagnetic radiations.

Objects of invention are: To make it possible to determine character of deposits by causing them to act as reflectors of electromagnetic radiant energy, and by ascertaining quality of reflections as a function of frequency used for radiations; and to make it possible to investigate character of invisible deposits by determining speed at which radiations pass through medium formed by deposits.

Claims allowed - 3.

133. ELLIOTT, RAYMOND D., of Whittier, Calif. (Assignor of one half to Edmund J. Young, of Berkeley, Calif.). Method of Locating the Level at which Water enters a Well. United States Patent 1537919, issued May 12, 1925.

Relates to a method and apparatus for locating the level at which water enters a well; the combination of steps consists of displacing the contents of the well by filling the well from the bottom up with a liquid of known electrical resistance, then withdrawing enough of the liquid from the well to permit the entrance of water from the water-bearing stratum, and then testing the electrical conductivity of the liquid column in the well at successive levels until a level is ascertained at which the electrical conductivity of the liquid column is different from that of the displacing liquid.

Claims allowed - 10.

134. GELLA, NORBERT (Cassel-Wilhelmshohe, Germany, assignor to Piepmeyer & Co.). Electrical Prospecting Device. United States Patent 1708386, issued Apr. 9, 1929.

Includes exploring coil for measuring intensity and direction of alternating magnetic fields by universally mounted coil with protection against capacity influences by tubular sheath.

Claims allowed - 4.

135. GISH, OLVIN H. (Somerset, Chevy Chase, Md., assignor to Carnegie Institution of Washington, a corporation of Washington, D.C.). Apparatus for the Study of the Earth's Crust. United States Patent 1813845, issued July 7, 1931.

Covers method and apparatus for taking electrical readings involving electrical current and potential as it passes through a given section of earth's crust. Invention relates to apparatus consisting of a source of current, an instrument for measuring the value thereof, a potentiometer, a double rotor commutator, leads from each rotor of said commutator to earth, leads from one of said rotors to current-measuring instrument and source of current, and leads from other rotor of said commutator to potentiometer.

Claims allowed - 7.

136. GODKIN, CECIL E. (Hayward, Calif.). Electromagnetic Detecting Device. United States Patent 1665662, issued April 10, 1928.

Discloses means of locating oil with aid of electric generator and galvanometer.

Claims allowed - 2.

137. GUILFORD, E. H. (Darwin, Calif.). Method of Locating Underground Conducting Bodies. United States Patent 1718352, issued June 25, 1929.

Describes method of inducing high-frequency currents in a conductor and detecting magnetic fields from currents in conductor and its general axis. Selection of optimum frequency and maximum distorting effects at a plurality of points and determination of apparent distortion of primary field are described. Method of determining depth of conductor from various positions of receiving coil is specified.

Claims allowed - 11.

138. GUNN, ROSS (Washington, D.C.). Thunderstorm or Electric Field and Potential Indicator. United States Patent 1919215, issued July 25, 1933.

Relates to apparatus and system for indicating electrical conditions of the atmosphere for determining the approach of thunderstorms. Consists of device for indicating electrostatic potential differences in combination, fixed insulated electrodes, electrodes movable into and out of position adjacent thereto, an amplifier connected to movable electrodes, an output circuit connected to the amplifier, a rectifier in the output circuit operating in synchronism with movable electrodes and an indicator connected with rectifier.

Claims allowed - 15.

139. HAYES, HARVEY C. (Washington, D.C.). Oscillograph. United States Patent 1860740, issued May 31, 1932.

Primarily concerns instruments employed to indicate or record slight electrical impulses or disturbances of various kinds. Instruments of type contemplated usually comprise some form of string galvanometer and any suitable means for reproducing in magnified form vibrations produced in galvanometer string as a result of electrical impulse imposed upon it.

Primary object of present invention has been to provide a simple and compact device capable of receiving and reproducing impulses from several sources simultaneously. To this end, in lieu of single galvanometer string a plurality of such strings are provided, and all are mounted in a single container or holder in such a way as to be in very close proximity and in a definite plane.

Claims allowed - 13.

140. HEDSTROM, ERIK HELMER (Houston, Tex.), AND ZUSCHLAG, THEODOR (New York, N.Y., assignors to Swedish-American Prospecting Corporation, New York, N.Y., a corporation of New York). Method of Determining the Direction of Alternating-Current Ground Fields. United States Patent 1912036, issued May 30, 1933.

Relates to electrical prospecting by means of artificially induced alternating-current ground fields, and has for its object provision of method and apparatus enabling various new and improved results to be attained.

Claims allowed - 9.

141. HERR, SHIRL (Crawfordsville, Ind.). Device for Underground Prospecting. United States Patent 1676779, issued July 10, 1928.

Discloses method of locating electrical conductors with aid of two coils, an exciting coil and a receiving coil. Alternating current is used in exciting coil, and respective axis can be sighted for mutually perpendicular adjustment. Normally this indicates a number of receptions of signal in receiving coil. Variation of this minimum indication is used as an index to disturbing electrical conductor.

Claims allowed - 4.

142. _____ Hidden-Metal Detector. United States Patent 1679339, issued July 31, 1928.

Covers method of locating hidden metal by inbalancing an alternating magnetic field in an exploring coil. Source of primary field is a coil fixed in an adjustable position relative to exploring coil near its center and having its axis at right angles to exploring coil.

Claims allowed - 4.

143. HIGHTHILL, AUGUST P. (Boston, Mass.). Means for Electrically Locating Mineral Veins. United States Patent 308908, issued Dec. 9, 1884.

Concerns method for ascertaining currents generated in mineral veins due to chemical changes thereof. Contact is made a few inches into ground, preferably with magnetically polarized probes, and a galvanometer is used to indicate current.

Claims allowed - 4.

144. HUBER, FREDERICK W., (of Riverside, Calif.). Method for Locating Water-Bearing Strata in Boreholes. United States Patent 1536007, issued April 28, 1925.

This invention relates to a method of determining the location of water-bearing strata in boreholes which consists in supplying to the borehole water presenting less saline concentration than the solution in the water-bearing strata so that diffusion from the water-bearing strata will establish a zone of relatively high saline concentration in the column of liquid in the borehole opposite a water-bearing stratum, then measuring the electrical conductivity of the liquid in situ at different parts of said column to determine the location of any part thereof presenting such relatively high saline concentration, while preventing fouling of the electrical measuring means by oil and while employing alternating current in said measuring operation.

Claims allowed - 10.

145. _____ Method of Locating Water-Bearing Strata in Boreholes. United States Patent 1555800, issued Sept. 29, 1925.

This invention relates to a method of determining the location of water-bearing strata in boreholes which consists in establishing in the borehole a column of water of relatively low saline concentration and permitting the formation therein of zones of relatively high concentration opposite each water-bearing stratum, measuring the saline concentration of different heights in the said column to determine the location of such zones of relatively high saline concentration, withdrawing water from such column to lower the upper level thereof, and repeating the measurement of saline concentration at different levels in said column to give a more exact and sharper indication of the location of zones of relatively high saline concentration.

Claims allowed - 8.

146. HUBER, FREDERICK W., (of Riverside, Calif.). Method of Locating Water-Bearing Strata in Boreholes. United States Patent 1555801, issued Sept. 29, 1925.

This invention relates to a method of locating fluid-bearing strata in boreholes which consists in determining the normal fluid level in the borehole, removing fluid from the borehole sufficiently to cause the fluid-bearing strata to discharge any intruded fluid into the borehole, displacing such connate fluid from the borehole by fresh water and continuing to supply fresh water to the borehole to bring the fluid level above normal fluid level, then making several successive series of electrical conductivity measurements in the fluid at different depths in the borehole, and lowering the fluid level by stages between each successive series of measurements so as to determine the depth at which connate fluid of different conductivity than the fresh water in the borehole enters such fresh water.

Claims allowed - 8.

147. _____ Apparatus for Locating Water-Bearing Strata in Boreholes of flowing Wells. United States Patent 1555802, issued Sept. 29, 1925.

This invention relates to a method for locating water-bearing strata in boreholes in oil- or gas-bearing formations, and the main object of the invention is to provide a means and method whereby the location of such water-bearing strata may be positively determined without interrupting the operation of the well. The claim of the inventor is as follows: In combination with an oil well a pipe independent of the oil-well casing is extended into said well and provided with means for passing water through it into the well, means for raising and lowering said pipe, an insulated conductor extending through said pipe, electrodes adapted to be exposed to the liquid in the well, an electrical circuit connected to said conductor, and means for measuring the resistance of the liquid between said electrodes.

Claims allowed - 4.

148. _____ Electrode Means for Conductivity Tests of Liquids in Oil Wells or other Bodies of Liquid. United States Patent 1555803, issued Sept. 29, 1925.

This invention relates to means for conductivity measurements in aqueous liquids containing oily material comprising a support, electrodes carried thereby, and electrical connections to said electrodes, said electrodes being of conductive material coated with oil repellent material.

Claims allowed - 8.

149. JAKOSKY, JOHN J. (assignor to Radiore Co. of Los Angeles, Calif., a corporation of California). Method and Apparatus for Locating Conductive Bodies. United States Patent 1792910, issued Feb. 17, 1931.

Covers means for employing a transmitting or energizing apparatus adapted to set up an electromagnetic field at points below earth's surface much more intense than that created at equal depths by any of transmitting means heretofore employed, for same power consumption and approximate size and cost of equipment.

Claims allowed - 8.

150. _____ Method and Apparatus for Locating Unknown Conductive Bodies. United States Patent 1811547, issued June 23, 1931.

Relates to location of orebodies, pipe lines, or other bodies of relatively good electrical conductivity within earth's crust or any mass of relatively poor conductivity, and particularly to location of such bodies by methods known as "inductive methods." Method comprises energizing conductive body by means of an electromagnetic field transmitted from an energizing loop, and then, by means of a direction-finding coil, detecting presence and measuring effect of secondary electromagnetic field resulting from induced current in conductive body at a plurality of points adjacent to energizing loop, direction-finding coil being rotated, for purpose of making such measurements, about an axis substantially parallel to direction from coil to energizing loop.

Claims allowed - 8.

151. _____ Method for Determining the Character of Orebodies. United States Patent 1818331, issued Aug. 11, 1931.

Relates to electrical methods for obtaining information regarding underground orebodies whose electrical conductivity is relatively high compared with that of surrounding rock or earth material - particularly to methods known as "inductive methods." Invention concerns method of determining location of fault or break in an orebody, which induces current flow in orebody by cutting it with a primary electromagnetic field, noting effect at points removed from source of electromagnetic field in a direction lengthwise of orebody of secondary electromagnetic field produced by such induced current flow, causing primary electromagnetic field to have at different times a relatively low frequency and a relatively high frequency, varying position of source of primary field and point of noting effect of secondary field and observing in each case relative effect of secondary field for each frequency of primary field. Thus a position is located such that if source of primary field and point of noting effect of secondary field are at same side of such position secondary field is of noticeable intensity at both high and low frequency, while if source and point are at opposite sides of such position secondary field at low frequency is either not noticeable or is of much less intensity than at high frequency.

Claim allowed - 1.

152. JAKOSKY, JOHN J. (Los Angeles, Calif.). Method and Apparatus for Determining Underground Structure. United States Patent 1906271, issued May 2, 1933.

Relates to method of determining underground structure, which comprises causing electric current to flow in a circuit including an external path insulated from earth and connected thereto at two separated points and an underground path between said separated points, and measuring by magnetometric means horizontal component of magnetic field created by such current flow at a point substantially in horizontal plane of said external current path.

Claims allowed - 11.

153. _____ Method for Determining Underground Structure. United States Patent 2015401, issued Sept. 24, 1935.

This invention relates to the method of determining the nature of the sub-surface which comprises creating an electrical disturbance in the earth, of short duration and high intensity, so as to produce in the region of said disturbance a sudden electromagnetic field impulse, and determining the time-integrated effect of said impulse at a known position.

Claims allowed -29.

154. KARCHER, JOHN C. (Dallas, Tex.). Method and Apparatus for Exploring Boreholes. United States Patent 1927664, issued Sept. 19, 1933.

Relates to method for continuously exploring boreholes during process of drilling, which consists in causing electric current to flow through a conductor insulated from drill stem of hole-drilling mechanism and connected to drill bit to cause current to flow from drill bit into earth from which said current is collected and then causing current to pass through measuring instruments for purposes of observation.

Claims allowed - 7.

155. KESTER, JESSE F. (Terre Haute, Ind.). Electrical Metal Detector. United States Patent 412924, issued Oct. 15, 1889.

Covers mineral detector consisting of a solid elongated tapering blade composed of a pair of metal strips riveted together without making electrical contact. This device is thrust into ground, and an indicator shows good electrical conductivity in proximity of ores or metals.

Claim allowed - 1.

156. LEE, FREDERICK W. (Baltimore, Md.). Method of Conducting Geological Survey. United States Patent 1951760, issued Mar. 20, 1934.

Relates to method of determining character of earth in various directions and at various depths or distances from a pair of current electrodes inserted into earth. It consists in comparing resistivity of portion of earth located between a pair of spaced points with resistivity of another portion of earth located between a second pair of spaced points, said pairs of points being respectively located at opposite sides of a straight line intersecting said pair of electrodes.

Claims allowed - 7.

157. LEONARD, GEORGE I. (Pasadena, Calif.). Method of Locating Minerals. United States Patent 736411, issued Aug. 18, 1903.

Covers method for measuring resistance between two electrodes placed in earth. It further specifies that earth be saturated with liquid bearing a saturated salt solution of metal composing electrode.

Claims allowed - 11.

158. LIGHTHILL, AUGUST P. (of Boston, Mass.). Means for Electrically Locating Mineral Veins. United States Patent 308908, issued Dec. 9, 1884.

The invention relates to an apparatus for detecting, finding, and locating mineral deposits; it consists of two metallic electrodes, preferably iron or steel, adapted to be set upon or be forced into the ground and connected through a galvanometer key and some source of electricity, preferably a battery. In applying the terminals of an open electric circuit containing indicator devices to the earth but not in contact with the veins, the presence or absence of the vein being indicated by the variations in the electric circuit due to the presence of said veins.

Claims allowed - 4.

159. LOTH, WILLIAM A. (Paris, France). Method of Electromagnetic Underground Prospecting. United States Patent 1672328, issued June 5, 1928.

Comprises application of alternating electric current to earth with electrodes and measuring of resultant magnetic field on surface with exploring coils.

Claims allowed - 12.

160. LÖWY, HEINRICH (Vienna, Austria). Means for Electric Proof and Measuring of the Distance of Electrically Conductive Bodies. United States Patent 1585591, issued May 18, 1926.

Describes method for measuring distance to electrically conductive masses acting as reflecting surfaces by adjusting frequency-modulation in a vacuum-tube circuit which alternately puts transmitter and receiver out of action. If time of cutting out transmitter and arrival of reflected wave are made to coincide, then a maximum effect is produced in receiver.

Claims allowed - 4.

161. _____ Means for Electroaviatic Proof and Measuring of the Distance of Electric Conductive Bodies. United States Patent 1492300, issued Apr. 29, 1924.

Covers antenna to be carried by a flying machine. Change of natural period of this antenna is measured with a test receiver, and its variation is an indication of electrical character of the ground.

" Claims allowed - 4.

162. _____ (Gottingen, Germany). Method for Ascertaining the Nature of Subterranean Strata. United States Patent 1092065, issued Mar. 31, 1914.

Discloses method of applying calibrated oscillating circuit in mine or hose hole and measuring variation of capacity and damping in circuit.

Claim allowed - 1.

163. LÖWY, HEINRICH (Göttingen, Germany). Method for Locating Subterranean Strata. United States Patent 1045575, issued Nov. 26, 1912.

Covers method of using reflected electromagnetic waves with a separation on surface for minimum interference expressed as a function of one half wave length.

Claims allowed - 5.

164. _____ (Vienna, Austria). Method of Exploring Ground. United States Patent 1864024, issued June 21, 1932.

Relates to improved method of exploring ground for determining therein existence, depth below ground, and, with some restrictions, also nature of strata under surface of ground differing in electric properties from surface. Method determines natural wave length and damping resistance of overground high frequency oscillation circuit of given constants at a point of ground to be explored.

Claims allowed - 2.

165. LUNDBERG, HANS TORKEL FREDRIK, AND KIHLSTEDT, FOLKE H. (Massapequa, N.Y., assignors to Swedish American Prospecting Corporation, New York, N.Y., a corporation of New York). United States Patent 1934079, issued Nov. 7, 1933.

Applies to method of electrical prospecting consisting of flooding a profile of a tract under investigation with current supplied from one side of profile, moving a ground-current-receiving network across the profile, and taking readings from point to point, then flooding profile with current supplied from opposite side of profile, and again moving ground-current-receiving network across profile and taking readings from point to point.

Claims allowed - 6.

166. LUNDBERT, HANS TORKEL FREDRIK (Lidingo Villastad, Sweden), AND NATHORST, HARRY JOHAN HJALMAR (Stockholm, Sweden). Ore Detector. United States Patent 1537360, issued May 12, 1925.

Covers method of determining equipotential lines on surface of ground by bringing two primary electrodes into contact with soil. One of these primary electrodes has considerable extension in a horizontal direction in proportion to distance between the two primary electrodes. Sensitive probing apparatus using alternating current are shown in illustrations.

Claims allowed - 6.

167. MARTIENSON, OSCAR (of Kiel, Germany) Method of and Device for Differentiating between Geologic Strata Traversed by Boreholes. United States Patent 2018080, issued Oct. 22, 1935.

This invention relates to a method of exploring characteristic differences between different geologic strata traversed by a borehole, consisting in moving a generator of high frequency oscillations and an appertaining radiator of a high frequency field of force through the borehole to successively expose each stratum individually to the field of force produced by said radiator, locally converting the different electric reactive effects produced upon said generator by the different reactions of said field to the different strata characteristics into correspondingly varying electric forces non-reactive upon said high frequency generator, transmitting said electric forces from the different points of exploration to the point of observation, and there observing the variation of said forces as a measure of the varying character of the traversed strata.

Claims allowed - 15.

168. MASON, MAX (Chicago, Ill.). Method of Determining the Nature of Subsoil. United States Patent 1692849, issued Nov. 27, 1928.

Discloses method of exploring subsoil by applying electrical energy to ground at 2 terminals, with 2 other terminals as indicating terminals. Relation of 2 current terminals and apotential terminal remains fixed; other detecting terminal is moved for minimum current. All four terminals preferably are colinear, and system is moved along definite line for observations.

Claims allowed - 3.

169. McCLATCHEY, AUGUSTUS F. (Aurora, Ill.). Apparatus for Locating Metals, Minerals, Ores, etc. United States Patent 686632, issued Nov. 12, 1901.

Shows in specifications that depth effect in resistivity measurements is a function of distance between stakes. It further describes various bridge arrangements with direct and alternating currents for making resistivity observations of ground.

Claims allowed - 8.

170. _____ Electric Prospecting Apparatus. United States Patent 681654, issued Aug. 27, 1901.

Gives specific methods of making contact with earth to avoid inaccuracies of measurement. Means for protecting terminals against electrolytic action by suitable chemicals, also special electrodes embracing above idea.

Claims allowed - 10.

171. McEVOY, CHARLES AMBROSE (Adelphi, England). Apparatus for Finding Torpedoes, etc. United States Patent 269439, issued Dec. 19, 1882.

Concerns system of primary and secondary coils; one set is lowered into water, other remains on board. Secondary coils are balanced under normal conditions but become unbalanced when near a torpedo.

Claim allowed - 1.

172. MELLETT, LEMUEL (Milford, Mass.). Electrical Ore-Detector. United States Patent 367422, issued Aug. 2, 1887.

Covers multiple arrangement of electrodes energized by a battery which upon coming in contact with a metallic conductor causes enough current to flow to actuate an indicating device. Intended for submerged use.

Claims allowed - 4.

173. MELLETT, LEMUEL, AND PRINCE, JEROME (Milford, Mass.). Electrical Ore Indicator. United States Patent 367541, issued Aug. 2, 1887.

Covers compass needle of multiple points which changes its rate of rotation near an orebody.

Claims allowed - 5.

174. MORTENSON, MAGNE (Trondhjem, Norway). Electrode for Geophysical Surveys. United States Patent 1910709, issued May 23, 1933.

Relates to electrode for electrical measurements or like comprising a porous container, porosity of which decreases from interior toward exterior, solution of metal salt in said container, and metal member mounted in said solution.

Claims allowed - 10.

175. MUESER, EMIL EDWARD (Mountain Lakes, N.J.). Electrical Prospecting. United States Patent 1791933, issued Feb. 10, 1931.

Attempts to overcome effect of undesirable magnetic fields set up by flow of currents through generator or other supply of electrical energy and through leads connecting generator to electrodes and through other apparatus associated with that part of system which supplies current to earth.

Patent shows how this undesirable magnetic field may be confined to close proximity with apparatus or connecting wires in which it is produced by covering apparatus and connecting wires with metallic shielding of high permeability and conductivity.

Claims allowed - 2.

176. NELSON, RUPERT (San Francisco, Calif.). Method of and Apparatus for Detecting the Presence of Ore Deposits in the Earth. United States Patent 1243380, issued Nov. 27, 1917.

Covers method of using different metallic ground electrodes and measuring deflection in quadrant electrometer. Electrode is connected to needle, and quadrants are excited by battery.

Claims allowed - 3.

177. NEUMANN, FRANZ JULIUS GERHARD AND HAUBOLD, WERNER RUDOLF (of Anahuac, Tex., assignors by mesne assignments, to the Salt Dome Oil Corporation, Houston, Tex., a corporation of Delaware). Apparatus for Making Geophysical Measurements. United States Patent 1983483, issued Dec. 4, 1934.

Apparatus for making geophysical measurements upon areas of the earth's surface covered by water, which comprises a support of a form capable of being fixed to the earth bottom underlying the water and extending to such a height above the bottom as to position above the water level a geophysical instrument mounted on said support, and a shield surrounding said instrument so constructed and so positioned with respect to said instrument as substantially to intercept motion of the water and to prevent disturbance due to motion of the water from reaching said instrument.

Claims allowed - 15.

178. NICHOLS, CHARLES R., AND WILLISTON, SAMUEL H. (Dallas, Tex.). Electrical Prospecting. United States Patent 1841376, issued Jan. 19, 1932.

Creates such electric current flow through earth as to impress an identifiable potential condition or characteristic on a portion of earth's surface, and by determination of direction and extent of displacement, if any, of such portion from a geographic location which is fixed by arrangements creating such current flow, and with which said surface portion will or will not coincide, accordingly as distribution of current flow through earth adjacent to said location is not or is significantly affected by an earth body or bodies of different conductivity from adjacent earth.

Claims allowed - 23.

179. NICHOLS, CHARLES R., AND WILLISTON, SAMUEL H. (Dallas, Tex.). Electrical Prospecting. United States Patent 1841975, issued Jan. 19, 1932.

Makes provisions made for effective use of portion of energizing circuit or circuit system external to earth itself, to establish definite or base potential at a point in said circuit system which may be utilized in determining potential at exploration point, or in making measurements dependent on difference between said base potential and exploring electrode potential.

Present invention is especially characterized by manner in which base potential point in energizing circuit is established, and in particular by steps taken to compensate for variable and ordinarily unknown, contact resistance between earth and external energization circuit at each point of energization.

Claims allowed - 8.

180. _____ Electrical Prospecting. United States Patent 1841976, issued Jan. 19, 1932.

Relates to methods of and apparatus for determining location and character of subsurface bodies of earth portions differing in electrical resistance from adjacent earth portions by creating potential differences between separated portions of the earth surface to induce current flows through earth underlying exploration field.

Provides method and apparatus adapted to rapid reconnaissance work along a line extending across the field to be explored, as well as means for making effective use of circuit system to establish a base potential which may be utilized in determining potential at an exploration point.

Claims allowed - 6.

181. _____ Electrical Prospecting. United States Patent 1842362, issued Jan. 19, 1932.

Consists in energizing an observation field by causing an electric current flow through earth between points thereof on which different potentials are impressed, as by means of electrodes inserted in earth and connected to terminals of an electric generator or generators, in order that resultant current flow distribution through earth may be determined or compared with current distribution which would result from such energization if earth beneath observation field was of uniform conductivity.

Claims allowed - 11.

182. _____ Electrical Prospecting. United States Patent 1863542, issued June 14, 1932.

Provides simple and effective method for determining depth beneath earth's surface of an earth layer or body of resistivity different from that of adjacent earth material.

Creates electrical current flow through earth between energization points, one of surface, varying depth below earth's surface of last-mentioned energization point, and comparing effects of current flow on potential conditions at earth's surface when subsurface energization point is at different depths.

Claims allowed - 4.

183. NICHOLS, CHARLES R., AND WILLISTON, SAMUEL H. (Dallas, Tex.). Electrical Prospecting. United States Patent 1926212, issued Sept. 12, 1933.

Concerns primarily location of oil deposits by electrical methods. In electrical determination of subsurface composition of earth method consists in successively creating potential difference between different groups of earth-surface portions regularly distributed over field of exploration, locating a similar isopotential line for each group, and plotting said lines on a map of said field.

Claims allowed - 4.

184. NICHOLS, CHARLES R. (New York, N.Y.), AND WILLISTON, SAMUEL H. (New Haven, Conn.). Electrical Prospecting. United States Patent 1842361, issued Jan. 19, 1932.

Provides improved methods for detecting location and character of subsurface bodies, or earth portions of different electrical resistance from adjacent earth portions.

Method consists of energizing distributed points in a field of observation by means of a source of alternating current so as to create isopotential lines which intersect at a point, and in locating said point by means of a detector circuit including an antenna movable over exploration field.

Claim allowed - 1.

185. NICHOLS, RALPH M. (Dallas, Tex., assignor of one half to Charles R. Nichols and one half to Samuel H. Williston, of Dallas, Tex.). Electrical Prospecting. United States Patent 1841977, issued Jan. 19, 1932.

Makes improvement, characterized by simplicity of apparatus and operations required, in method of determining location and character of subsurface bodies or earth portions of different electrical resistance from adjacent earth portions, by creating electric current flow through earth and measuring electrical effects produced at surface of earth resulting from such current flow.

Claims allowed - 3.

186. OSTERMEIER, JOHANN B (Mering, near Augsburg, Germany, assignor to Hauser and Co. G.m.b.H., Augsburg, Germany). Method of and Apparatus for Searching for Ores. United States Patent 1966105, issued July 10, 1934.

The present invention relates to a method of searching for ore deposits comprising the steps of connecting two electrodes of electrically equivalent material in a circuit by means of an intermediate electrolyte such as water, testing the ground by means of one of the electrodes and determining the potential difference created between said electrode and the second electrode when the first electrode touches an ore deposit.

Claims allowed - 6.

187. PETERS, LEO G. (of Pittsburgh, Pa., assignor to Gulf Production Co., Houston, Tex., a corporation of Texas). Method and Apparatus for Electrical Prospecting. United States Patent 1938534, issued Dec. 5, 1933.

This invention relates to the method of electrically determining the character of geologic structure beneath the surface of the earth which comprises generating an alternating exploring current having a frequency of less than 100 cycles per second, applying said exploring current to the earth in such manner as to set up therein a low frequency electric or electro-magnetic field, deriving a low frequency current from the earth thus provided with said low frequency electric or electro-magnetic field, translating said earth-derived low frequency current into current having a frequency greater than 100 cycles per second and an amplitude proportional to the amplitude of said earth-derived current, and determining the character of said earth-derived low frequency current by an indicating device activated by said current of higher frequency and proportional amplitude.

Claims allowed - 8.

188. _____ Method of an Apparatus for Electrical Prospecting. United States Patent 1938535, issued Dec. 5, 1933.

Relates to method of electrically determining character of geologic structure beneath surface of earth, which comprises generating an alternating exploring current having a frequency of less than 100 cycles per second, applying said exploring current to earth in such manner as to set up therein low-frequency electric or electromagnetic field, deriving low-frequency current from earth thus provided with said low-frequency electric or electromagnetic field, translating said earth-derived low-frequency current into current having a frequency greater than 100 cycles per second and amplitude proportional to amplitude of said earth-derived current, rectifying said current of higher frequency and proportional amplitude, and determining character of said earth-derived low-frequency current by means comprising indicating device activated by said higher-frequency current after rectification.

Claims allowed - 7.

189. PRINCE, JEROME (Milford, Mass.). Means for Electrically Locating and Following Veins of Metal in the Earth. United States Patent 293518, issued Feb. 12, 1884.

Discloses method of indicating change of resistance of two terminals, fixed at constant distance from each other, to flow of electric current.

Claims allowed - 2.

190. RICKER, NORMAN H. (assignor to J. P. Scranton, Houston, Tex., trustee). Means and Method of Observing and Measuring Electromagnetic Fields. United States Patent 1859005, issued May 17, 1932.

Relates to means and method of measuring alternating electromagnetic fields in general and finds application in exploring for underground mineral deposits.

One object of this invention is to provide a method of observing and measuring electromagnetic fields based on the use of differential field between two slightly separated points as compared with field itself in neighborhood of these two points.

Further object is to provide an apparatus for making observations by means of this method whereby nature of electromagnetic field is determined. A mathematical theory of method is developed.

Claims allowed - 12.

191. RICKER, NORMAN H. (Houston, Tex.). Means and Method of Electrical Prospecting. United States Patent 1934447, issued Nov. 7, 1933.

Relates to means and method of exploring regions beneath surface of earth for deposits of petroleum, natural gas, asphalt, certain metallic sulphides, mineral masses, and other substances or formations whose electromagnetic constants differ from those of surrounding earth.

Method of exploring consists of causing alternating electric currents to flow in earth, determining at a series of points over surface of earth angular position in space of normal to plane of vibration ellipse of electric field associated with said currents, and coordinating data so obtained.

Claims allowed - 24.

192. _____ Method of Electrical Prospecting. United States Patent 1960027, issued May 22, 1934.

This invention relates to electrical methods of prospecting for oil, gas, water, ore bodies, and any other buried masses whose electromagnetic constants are different from those of the surrounding earth. The method comprises setting up an alternating electromagnetic field which would possess symmetry about a vertical axis were the earth electromagnetically homogeneous, making observations at a series of correlated points of the position in space of the plane of the vibration ellipse of the magnetic component of said electromagnetic field, and coordinating the data so obtained.

Claims allowed - 14.

193. _____ Means of Electrical Prospecting. United States Patent 1960028, issued May 22, 1934.

This invention relates to an apparatus for determining the existence and location of concealed objects whose electromagnetic constants differ from those of the surrounding space, including a linear conductor disposed in the form of a closed plane figure, said figure having a definite number of lines of symmetry, a source of alternating current for energizing said conductor, and means to determine the departure from symmetry of the resulting electromagnetic field.

Claims allowed - 4.

194. RIEBER, FRANK (of Berkeley, Calif., assignor to Frank Rieber, Inc., of San Francisco, Calif., a corporation of California). Electrical Prospecting System. United States Patent 1702265, issued Mar. 21, 1933.

This invention relates to the method of determining the distribution of earth conductivity which comprises the steps of passing a current between points on the earth's surface, and measuring the vertical component of said current within the earth.

Claims allowed - 8.

195. ROGERS, CULIEN R. (Graham, Tex.). Electrical Geological Disturbance Detector. United States Patent 1872504, issued Aug. 16, 1932.

Covers vibration detector whereby geophysical disturbances may be converted into a corresponding fluctuating current of electricity, which in turn may energize a suitable indicating or recording device.

Claims allowed - 5.

196. SCHLEICHER, MANFRED (Berlin-Charlottenburg, Germany). Apparatus for Measuring Earth Resistances. United States Patent 1775502, issued Sept. 9, 1930.

Relates to apparatus for measuring earth resistance and diffusion resistance of type of so-called zero method; that is, apparatus includes a circuit with an indicating device having a scale, and proper adjustment is made until no current flows in such circuit and indicating device therefore points to zero. This invention has for its object to provide an apparatus operating to zero method but avoiding drawbacks which have so far interfered with satisfactory use of zero-method apparatus.

Claims allowed - 3.

197. SCHLUMBERGER, CONRAD. Process for Determining the Nature of the Subsoil by the Aid of Electricity. United States Patent 1163468, issued Dec. 7, 1915.

Covers charting of equipotential curves about an electrode placed in the ground. It is supplied with direct or alternating current, and nonpolarizable exploring electrodes are used. From comparison of these curves with theoretical equipotential curves nature of subsoil is determined.

Claims allowed - 6.

198. _____ Location of Ores in Subsoil. United States Patent 1163469, issued Dec. 7, 1915.

Applies unpolarizable terminal electrodes to soil for determining series of equipotential curves produced by ore layers on the surface of ground.

Claims allowed - 3.

199. _____ Method for the Location of Oil-Bearing Formations. United States Patent 1719786, issued July 2, 1929.

Describes method of measuring conductivity of ground between a pair of surface points spaced apart on a radius through one terminal - the other is shown at a great distance from the first. Oil-bearing formations are located by comparing areas of greatest electrical conductivity coincident with greatest salinity.

Claim allowed - 1.

200. _____ (assignor to Societe de Prospection Electrique, Procedes Schlumberger, of Paris, France, a corporation of France). Electrical Process and Apparatus for the Determination of the Nature of the Geological Formations Traversed by Drill Holes. United States Patent 1819923, issued Aug. 18, 1931.

Relates to electrical process and apparatus or system for determining geological formations traversed in drilling operations without help of a mechanical coring device, as used up to present day.

Process consists in replacing mechanical coring by measurement of electrical specific resistivity of different rocks traversed, measurement taking place inside drill hole, at different depths. Apparatus for carrying out this process consists of a measuring instrument - a potentiometer, for example - placed at surface of soil and connected by insulated wires to one or more electrodes at different depths in water which normally fills drill hole.

Claims allowed - 4.

201. SCHLUMBERGER, CONRAD (Paris, France). Electrical Device for the Determination of Specific Resistivity. United States Patent 1894328, issued Jan. 17, 1933.

Determines nature of geological formations traversed by a drill hole and comprises two electrodes placed at a known and small distance from each other in water, filling uncased part of said drill hole; means for varying depth of these two electrodes in drill hole; means for measuring current flowing in circuit constituted when one of these two electrodes is connected by insulated wire to a source of current whose other pole is earthed; means for measuring difference of potential thus created between second electrode in drill hole and a third electrode in contact with surface of soil, such means being connected by insulated wires to two electrodes, whereby an approximate value for resistivity of earth at depth of two electrodes inside drill hole can be deduced.

Claim allowed - 1.

202. _____ Electrical Process for the Geological Investigation of the Porous Strata Traversed by Drill Holes. United States Patent 1913293, issued June 6, 1933.

Relates to electrical process for geological investigation of porous strata traversed by a drill hole, consisting in filling hole with water or mud, and measuring in this fluid at various depths in uncased part of hole differences of potential which spontaneously take place at contact between porous strata and said fluid.

Claims allowed - 3.

203. _____ Process for the Reconnaissance of the Geological Formations, and especially for the Study of Porous Strata Encountered by a Borehole. United States Patent 1970342, issued Aug. 14, 1934.

This invention relates to the method of determining the degree of salinity of the water contained in a porous stratum encountered by a borehole, which consists in measuring in a mud of a given salinity filling the borehole the electromotive force of the concentration element constituted by the water in the stratum, the mud in the borehole and the surrounding rocks, and then repeating the said measurement with a mud of a different salinity in the borehole.

Claims allowed - 3.

204. _____ Apparatus for Sampling the Rock in Boreholes. United States Patent 2015875, issued Oct. 1, 1935.

A side-wall sample taker adapted to be lowered into boreholes, the necessary power for forcing the sampling tool into the formation being provided by a piston, one side of which is subjected to the hydrostatic pressure of the drilling fluid filling the borehole

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at the depth at which the instrument is operated, and the other side being subjected to a lower pressure, the movement of said piston being electrically controlled from the surface.

Claims allowed - 4.

205. SHEPARD, EDGAR R. (of Chevy Chase, Md., assignor to the Government of the United States). Electric Measuring Device. United States Patent 1978440, issued Oct. 30, 1934.

This invention relates to an electrical device adapted for the measurement of the electrical resistivity of soil and the like, an anode and a cathode adapted to engage the material to be measured, said cathode having a relatively large surface area adapted to engage said material, compared with that of said anode, whereby polarization may be reduced to a minimum.

Claims allowed - 22.

206. SLICHTER, LOUIS B. (Madison, Wis.). Apparatus for Exploring for Ore. United States Patent 1826961, issued Oct. 13, 1931.

Relates to detection of conducting orebodies through use of exploring means disposed within a drill hole or the like. Method comprising present invention is in essence one of determining effective or mean electrical conductivity of material pierced by or located in vicinity of a drill hole. Apparatus used for this purpose, as described in this patent, consists of an elongated member having four electrodes adapted to connect electrically with earth surrounding drill hole, means for applying current to outermost of said electrodes, means for reversing said current at intervals, and means for measuring potential between intermediate electrodes of said four electrodes.

Claims allowed - 3.

207. SUNDBERG, KARL (Rasunda, Sweden, assignor to Aktiebolaget Elektrisk Malmletning). Method and Device for Detecting and Locating Ores in an Electromagnetic Way. United States Patent 1678489, issued July 24, 1928.

Discloses method of subjecting ground to reaction of alternating magnetic field and measuring relative field intensities in excited region. This is done with two coils and, if necessary, also by aid of suitable extra series or shunt resistances or inductances. Procedure is described in detail. A portion of a known alternating magnetic field is balanced against unknown one.

Claims allowed - 15.

208. SUNDBERG, KARL, AND LINDBLOM, ERIK DAVID (Stockholm, Sweden, assignors to Aktiebolaget Elektrisk Malmletning, of Stockholm, Sweden, a company of Sweden). Method and Apparatus for Subsoil Investigating. United States Patent 1820953, issued Sept. 1, 1931.

Relates to method of discovering and determining position, configuration, and nature of ores, solutions of salts, or other bodies by ascertaining and investigating disturbances which such bodies produce in electromagnetic field. Apparatus for carrying out this method is included also.

Method consists in producing electromagnetic field and determining it at different points and in any desired direction as regards strength and phase by compensating electromagnetic field by means of another field.

Apparatus can produce electromagnetic field and also another field for compensating such electromagnetic field.

Claims allowed-10.

209. SUNDBERG, KARL, AND LINDBLOM, ERIK DAVID (Houston, Tex., assignor to Aktiebolaget Elektrisk Malmletning, of Stockholm, Sweden, a corporation of Sweden). Method of Mapping Subsurface Structures. United States Patent 1884364, issued Oct. 25, 1932.

Relates to potential method of electrical prospecting and has for its object provision of improved form of this method for mapping subsurface structures.

Claims allowed - 6.

210. SUNDBERG, KARL AND HEDSTRÖM, ERIK HELMER LARS (of Stockholm, Sweden, assignors to Aktiebolaget Elektrisk Malmletning, Stockholm, Sweden, a company of Sweden). Method of and Apparatus for Electrical Investigation of Rock Drill Holes. United States Patent 1996530, issued Apr. 2, 1935.

A method of electrically investigating rock drill holes for identifying and locating rocks, ores, oil-carrying strata, and the like in such holes, comprising filling the drill hole with an electrically conductive liquid, generating an electric alternating field in the liquid-filled hole, and determining the relative value of the said field as regards phase and amplitude at different points of the drill hole.

Claims allowed - 7.

211. VARIAN, RUSSELL H. (Houston, Tex., assignor to Standard Oil Development Co., a corporation of Delaware). Apparatus for Geophysical Exploration. United States Patent 1951716, issued Mar. 20, 1934.

Applies to apparatus for measuring magnetic field produced by periodically reversed electric current passing through earth, comprising a body responsive to magnetic influence and adapted to vibrate or oscillate at frequency of current, means for concentrating upon said body, a magnetic field produced by current, and means for annulling any steady magnetic field that may be present.

Claims allowed - 4.

212. VARLEY, CROMWELL F. (Bexley Heath, England). Electric Divining-Rod. United States Patent 277087, issued May 8, 1883.

Discloses method of locating ores from effects of natural electric currents which traverse lode. Rotating coils in conjunction with commutator and galvanometer from detecting device.

Claim allowed - 1.

213. VON SCHOULTZ, MAX (St. Petersburg, Russia). Apparatus for Searching of Sunken Bodies. United States Patent 840018, issued Jan. 1, 1907.

Describes system of electromagnetic finders secured to cable and dragged along sea bottom. Differences in magnetic permeability from surrounding element operate a signal connection in finder.

Claims allowed - 2.

214. VOS, MAURITZ (Stockholm, Sweden), AND SUNDBERG, KARL (Rasunda, Sweden, assignors to Svenska Radioaktiebolaget of Stockholm, Sweden). Method for Electrical Searching of Ore. United States Patent 1660774, issued Feb. 28, 1928.

Applies to method for detecting presence of ore deposits by direct-connecting an alternator to earth and measuring magnetic field distribution in excited area. Intensities greater than normal field intensities indicate presence of orebodies.

Claims allowed - 4.

215. WEST, THOMAS S. (Drumright, Okla.). Process of and Apparatus for Locating Mineral Deposits in Subsurface Earth Strata. United States Patent 1845379, issued Feb. 16, 1932.

Relates to apparatus for locating ore, oil, gas, and other mineral substances, embodying an electrode adapted to be lowered into a well by an insulated conductor and into electrical connection with a desired stratum; means for insulating said conductor and electrode from a desired portion of the well's wall; means for measuring magnitude, phase relations, and other characteristics of electric current electrically connected at a point distant from well with stratum through a different earth stratum; means connected to measuring medium to regulate current; and means connected between regulating means and conductor for producing an electrical potential difference there between.

Claims allowed - 5.

216. _____ (Nowata, Okla.). Process of Locating Buried Pipe Lines, etc. United States Patent 1893311, issued Jan. 3, 1933.

Concerns electrical circuits generally; object of invention is to provide reliable means for locating pipe lines, cables, or conduits at points where their exact location is not known. With slight modifications this invention can also be used for location of subsurface electrical inhomogeneities of any nature.

Claims allowed - 3.

217. WILLIAM, JOHN R. (Seattle, Wash.), AND HICKIES, WILLIAM W. (Oakland, Calif.). Apparatus for Examining Ores. United States Patent 380842, issued Apr. 10, 1888.

Shows method of examining rocks in situ, as well as hand specimens to determine whether they contain metallic ores. Battery and telephone receiver connected in series to two metallic brushes constitute device. When applied to conducting ore current actuates receiver.

Claims allowed - 2.

218. ZUSCHLAG, THEODOR. (New York, N.Y.). Method of Investigating the Nature of Subterranean Strata. United States Patent 1652227, issued Dec. 13, 1927.

Describes method of deducing nature of strata surrounding a drill hole by setting up antenna in hole, subjecting it to variable frequency, and thereby ascertaining resistance characteristics to each frequency.

Claim allowed - 1.

219. ZUSCHLAG, THEODOR. (assignor to Taumac Corporation). Method and Apparatus for Exploring Subterranean Strata. United States Patent 1676847, issued July 10, 1928.

Shows method of determining amplitude and phase of alternating magnetic field in three perpendicular directions and computing resultant therefrom. Bridge circuits with vacuum-tube amplifiers are described in specifications.

Claims allowed - 3.

220. _____ Method and Apparatus for Locating Orebodies. United States Patent 1692530, issued Nov. 20, 1934.

Describes method of reducing magnetic field from wires applied to stakes using alternating current, by employing another system of stakes in adjacent circuit parallel to former in which current of same amplitude but not of same circuit flows in phase opposition.

Claims allowed - 7.

221. _____ Method of and Apparatus for Locating Terrestrial Conducting Bodies. United States Patent 1812392, issued June 30, 1931.

Invention relates to electromagnetic device for determining effects produced by conducting bodies, such as ore deposits, metals, watercourses, salt-water beds, moist ground and like, when electromagnetic field is generated in their vicinity, and method of locating and determining the proximity of the conducting bodies by the use of such a device. Apparatus comprises an exciter coil adapted to generate a primary electromagnetic field to induce a secondary field in any conducting body located in vicinity, a plurality of receiving coils adapted to be inductively influenced by secondary field, receiving coils being disposed on opposite sides and in center of exciter coil, and providing compensating means for eliminating any inductive influence of primary field on receiving coils.

Claims allowed - 20.

222. _____ Electrical Prospecting Apparatus. United States Patent 1884496, issued Oct. 25, 1932.

Concerns provision of improved form of alternating-current prospecting apparatus wherein exciter and search circuits are incorporated with a compensating or interconnecting circuit in such manner as to permit determination of amplitude of e. m. f. induced by a ground field as well as phase relation of ground field to exciter field. Such improved apparatus may be used in either potential or electromagnetic investigations and includes suitable means for determining magnitude and phase relation of investigated ground field on basis of exciter-circuit current.

Claims allowed - 5.

223. _____ (New York, N.Y., assignor to Swedish-American Prospecting Corporation, New York, N.Y., a corporation of New York). Electrical Prospecting. United States Patent 1940340, issued Dec. 19, 1933.

Relates to method of electrical prospecting which comprises setting up electric ground field in a tract to be investigated, producing a current flow in two parallel circuits, each of which has at least one variable resistance by ground-field intensities of different portions of said tract, setting variable resistance of one of said circuits at an arbitrary value, balancing circuits by suitably adjusting variable resistance in other circuit until same current flows through both circuits, noting values of variable resistances, altering variable resistance of one of said circuits to another arbitrary value to produce a different current flow there through, again balancing said two circuits by suitably adjusting variable resistance in other circuit until same current flows through both circuits, and noting new values of variable resistances.

Claims allowed - 12.

224. ZUSCHLAG, THEODOR. (New York, N.Y., assignor to Swedish-American Prospecting Corporation, New York, N.Y., a corporation of New York). Electrical Prospecting. United States Patent 1951386, issued Mar. 20, 1934.

Concerns electrical prospecting and has for its object certain improvements in method. Relates more particularly to improved method that may be employed for determining and comparing electrical potentials or electromagnetic field strength such as are encountered when investigating artificial electric ground fields set up for purpose of making geophysical explorations on earth's surface.

Claims allowed - 16.

225. _____ Electrical Prospecting. United States Patent 1951387, issued Mar. 20, 1934.

Covers improvements in apparatus for electrical prospecting, comprising a detached field excitation device for setting up an electric ground field; and a compensating network, associated but not connected with said excitation device and including two circuits in parallel, each of which is provided with at least one variable resistance and two electrically identical resistances connected in series with said variable resistances.

Claims allowed - 24.

226. _____ Electrical Prospecting. United States Patent 1997163, issued Apr. 9, 1935.

In an apparatus for electrical prospecting, the combination comprising a conductive network provided with two circuits in parallel when employed in conjunction with a tract to be investigated, and each circuit being provided with at least one variable resistance connected in series with a stator of a variometer, said circuits being provided with a common branch.

Claims allowed - 13.

6. Geothermal Methods

227. BOND, LEWIS A. (Los Angeles, Calif., assignor to Shell Oil Co., San Francisco, Calif., a corporation of California). United States Patent 1901431, issued Mar. 4, 1933.

Relates to method of determining true rock temperatures in well, which comprises: (1) Lowering into lower end of well heat-sensitive element sealed from that portion of well above said element, and recording temperature of said element; (2) lowering

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a heat-sensitive element a distance below normal bottom of said borehole and recording temperature to which said heat-sensitive element is subjected. Device is a combination of a heat-sensitive element in lower part of a well, sealing means for sealing said heat-sensitive element in a chamber formed by walls of lower end of said well, and recording means for recording temperature in said chamber.

Claims allowed - 3.

228. HUBER, FREDERICK W. (Riverside, Calif.). Means for Measuring Temperature in Boreholes. United States Patent 1818221, issued Aug. 11, 1931.

Depends upon application of thermoelectric current created by temperature upon two dissimilar metals in contact. Apparatus for measuring temperature in boreholes, involved in this patent, contains a casing and a receptacle therein for a body of material adapted to maintain constant temperature; thermoelectric means, having junctions in heat transmitting relation with constant-temperature body and junctions adapted to be brought into heat-transmitting relation with body whose temperature is to be measured; cable means for supporting and suspending said casing for bringing thermoelectric means to location at which temperature measurement is to be taken, cable including electric conductors connected to thermoelectric means; and electrical measuring means connected to cable conductors to measure potential difference thereof.

Claims allowed - 3.

229. MARSH, HALLAN N., AND HOWARD, JOHN H. (Huntington Park, Calif.). Apparatus for Determining Deep-Well Temperatures. United States Patent 1913845, issued June 13, 1933.

Determines temperature in boreholes; apparatus comprises a rigid metallic case adapted for lowering to desired depth in borehole. Case has plurality of noncommunicating chambers adapted to hold fragments of solids having graduated and predetermined melting points; means for excluding liquids and outside pressure from interior of chambers, and means for lowering case into hole and for withdrawing it therefrom.

Claims allowed - 4.

7. Unclassified Methods

230. LAUBMEYER, GÜNTHER (Kassel-Wilhelmshohe, Germany). Method of and Apparatus for Detecting the Presence of Profitable Deposits in the Earth. United States Patent 1843878, issued Feb. 2, 1932.

Consists of collecting underground air by means of a special apparatus and testing it quantitatively for existence of certain gaseous substances in direct relation to deposits. Apparatus is in form of closure or lid for borings, lid having outlet pipe and at least one bell-shaped cylinder or like surrounding it; diameter of this cylinder is lager than that of borehole. Construction may contain two cylinders arranged concentrically.

Claims allowed - 8.

BRITISH, CANADIAN, AND AUSTRALIAN PATENTS

1. Gravitational Methods

231. STANDARD OIL DEVELOPMENT CO. (a corporation of Delaware, U.S.A.). Improvements Relating to Torsion Balances for Geophysical Measurements. British Patent 381892, issued Oct. 13, 1932.

Comprises application to torsion balance of Kelvin bifilar suspension mirror instead of usual mirror at center of balance beam, whereby practical applicability of torsion balance is greatly increased.

Claims allowed - 3.

232. STANDARD OIL DEVELOPMENT CO. (New York City, N.Y.). Relative Gravity-value Measuring Apparatus, Canadian Patent 340813, issued Apr. 10, 1934.

Relates to an apparatus for measuring relative values of gravity, comprising two bars attached to each other at their center at an angle, a beam, a pair of inextensible filaments for suspending the beam from one of the bars, a second pair of filaments, one end of each filament being connected to the second bar, means for yieldingly connecting the other end of the second pair of filaments to the beam, and means for recording the rotational deflections of the beam due to changes in gravity.

Claims allowed - 12.

233. STANDARD OIL DEVELOPMENT CO. (New York City, N.Y., assignee of Ludwig W. Blau, Houston, Tex.). Torsion Balance. Canadian Patent 341532, issued May 8, 1934.

Relates to a combination with the balance beam of a torsion balance of the type used in gravitational measurements of a support, a suspension mirror, a filament suspending the mirror from the balance beam, a second filament suspending the mirror from said support, whereby the mirror is oscillatory rotated by the balance beam when said beam is rotated.

Claims allowed - 3.

234. SYKES, HUBER WENGER (Starley Road, Coventry, Warwickshire). Improvements in Apparatus for the Measurement of Gravitational Force. British Patent 370165, issued Apr. 7, 1932.

Relates to instrument for indicating and recording variations in force of terrestrial gravitation, and has for its object to provide extremely sensitive instrument by use of which variations may be observed and recorded accurately.

According to this invention instrument comprises flexibly supported load having operatively interconnected therewith means for indicating and recording variation in vertical position of load.

Claims allowed - 5.

235. ZEISS, CARL (Carl Zeiss-Strasse, Jena, Germany). Improvements in Pendulums for Gravity Determinations. British Patent 394081, issued June 22, 1933.

Covers pendulums for gravity determinations provided with adjusting screws. These adjusting screws are given such positions that their axes lie in a plane containing knife edge of pendulum. Desired adjustment is arrived at by giving screws suitable lengths. In addition to lying in the plane containing knife-edge the axes of screws also parallel knife-edge.

Claims allowed - 7.

2. Magnetic Methods

236. AMBRONN, DR. RICHARD (Göttingen, Germany). Improvements in or Relating to Apparatus for the Complete Determination of the Direction and Strength of Magnetic Fields, in Particular of the Natural Magnetic Field of the Earth. British Patent 344465, issued Feb. 26, 1931.

Relates to apparatus for complete determination of elements of a magnetic field, in particular of magnetic field of earth, by means of magnetic balance beam with horizontal axis, so mounted as to be adjustable bodily at will with relation to a circular scale to an arbitrary azimuthal position about a vertical axis, means being provided to measure inclination of beam at a plurality of at least three-adjustment positions about vertical axis.

Claims allowed - 10.

237. ASKANIA-WERKE AKTIENGESELLSCHAFT (formerly Centralwerkstatt Dessau) AND BAMBERG-FRIEDENAU, CARL (Berlin-Friedenau, Germany). Improvements in or Relating to Magnetic Balances. British Patent 369053, issued Mar. 17, 1932.

Relates to balance system for magnetic balances comprising magnet blades and a central body to which the blades are secured. Central body and blades are made of material having substantially equal coefficient of expansion. A further feature of invention is provision of compensating means on each side of axis of rotation of system for producing oppositely directed turning moments about axis, relative magnitudes of turning moments being variable with temperature variations and also being adjustable independently of temperature and of each other.

Claims allowed - 12.

238. HAUSER & CO. (G. m. b. H., Frauentorstrasse F. 9-12, Augsburg, Germany) AND OSTERMEIER, JOHANN BAPTIST (Hans-Sachsweg, 6 Mering, near Augsburg, Germany). Improvements in and Relating to Magnetic Balances. British Patent 398036, issued Sept. 7, 1933.

Covers magnetic balance, particularly for field work, consisting essentially of movable magnetic system equipped with reflecting face (mirror or prism) and arranged within a casing in such a manner that it may be rotated about an axis of rotation. Device for determining inclination of system consists of two optical systems, one containing a reading mark and the other a scale. Both optical systems form same angle with mirror surface, so that an image produced by one of said systems may be observed through other system.

Improved stopping device is also provided.
Claims allowed - 6.

239. HAUSER AND CO., G. m. b. H., (of Augsburg, Germany) AND OSTERMEIER, JOHANN BAPTIST (of Mering, near Augsburg, Germany). Improvements in and Relating to Magnetic Balances. British Patent 407946, issued Mar. 26, 1934.

A magnet system with knife-edge bearing for magnetic balances particularly for outdoor work, comprising a central body and magnet laminae or rods attached thereto characterized in that each of the laminae is fastened to the central body at one point only and engages along an edge or edges parallel to the magnetic axis, with the said central body.
Claims allowed - 17.

240. ROUX, DR. ERWIN, ASKANIA-WERKE AKTIENGESELLSCHAFT (formerly Centralwerkstatt Dessau), AND BEMBERG-FRIEDENAU, CARL (Berlin-Friedenau, Germany). Balance for the Measurement of Magnetic Intensities. British Patent 343050, issued Feb. 12, 1931.

Applies to magnetic balance for measurement of magnetic intensity, forming casing of two parts, one of which can be readily moved relative to other to open interior of casing. Casing is combined with pair of balance systems adapted to be supported selectively by knife-edge pivot on a common point of pivotal support within casing. One of balance systems has vertical equilibrium position of balance and other a horizontal equilibrium position of balance, combination permitting both horizontal and vertical components to be measured on one instrument.
Claims allowed - 9.

241. TRUMAN, ORLEY H. (Houston, Tex., assignor to Standard Oil Development Co., New York, N.Y.). Magnetometer. Canadian Patent 316809, issued Nov. 3, 1931.

Refers to magnetometer, and involves combination of magnet system, means for suspending it for movement without substantial friction in a plane, weights mounted on magnet system, springs connected thereto, and means for adjusting weights and springs to place magnet system in operative position.
Claims allowed - 3.

3. Seismic Methods

242. ANGLO-PERSIAN OIL CO., LTD. (a British joint-stock corporation) AND JONES, JOHN HUGH (Hastings, Sussex). Improvements Relating to Seismographs and Applicable to Other Measuring Instruments. British Patent 323552, issued Jan. 9, 1930.

Applies to means for indicating or recording small displacements and for indicating or registering minute electrical currents. Measures small displacements or minute electrical currents and is applicable to seismographs and other measuring instruments. An iron armature is suspended transverse to a rapidly varying magnetic field having strongly curved lines of force in such manner that it will take up a position parallel, or nearly parallel, to tangent to a particular line of force at any particular point, so that on a relative movement of armature and source of magnetic field, or on distortion of magnetic field, armature will take up a new position.

Claims allowed - 6.

243. ANGLO-PERSIAN OIL CO., LTD. (a British joint-stock corporation) AND JONES, JOHN HUGH (Hastings, Sussex). Improvements Relating to Seismographs and Applicable to Other Measuring Instruments. British Patent 343917, issued Feb. 23, 1931.

Relates to improvement in or modification of invention described in specification 323552. Consists of improved construction of magnetic magnifier by which greater sensitiveness of operation may be obtained.

According to invention, magnetic field is produced by plurality of magnets so disposed that lines of force in which magnetic element is set are not only strongly curved but concentrated to greater intensity. Moreover, means may be provided - for example, in form of coils applied to one or more of magnets - whereby magnetic field may be controlled as to intensity or direction and may be distorted at will.

Claims allowed - 7.

244. SUBMARINE SIGNAL CO. (London) LTD., (A British Company) AND HEDLEY, ELIAS (of London). Improvements in or relating to apparatus for acoustically determining depths and other distances. British Patent 421338, issued Jan. 2, 1935.

This invention relates to the apparatus for determining depths wherein a sound is reflected from the bed of the ocean or from an object the distance of which it is desired to determine, the time between the production of the sound and reception of the echo affording a measure of the depth or distance as the case may be.

Claims allowed - 15.

245. TRUMAN, ORLEY H. (Houston, Tex., assignor to Standard Oil Development Co., New York, N.Y.). Geophysical Exploration Method. Canadian Patent 328707, issued Dec. 20, 1932.

Relates to method of underground exploration by means of impulses impressed upon earth. Improvement comprises sending an impulse, sending a second impulse in such relation to first that indications of two do not conflict substantially, receiving said impulses at same station, noting indications received, and estimating underground structure therefrom.

Claims allowed - 10.

246. TURNER, EDWIN E., JR., AND BATES, RALPH E. (assignors to Submarine Signal Co., a corporation organized under the State of Maine, 160 State St., Boston, Mass.). Improvements in Apparatus for Recording Distances or Depths by the Echo-Sounding Method. British Patent 388567, issued Mar. 2, 1933.

Relates to apparatus for recording distance or depth measurements, such as height of aircraft from ground or depth of water beneath a vessel, by echo-sounding method.

Claims allowed - 12.

4. Electrical Methods

247. AMBRONN, RICHARD (of Reinhäuserlandstrasse, Göttingen, Germany). An Electrical Process for Facilitating the Discovery of Mineral Deposits. British Patent 219437, issued July 31, 1924.

This invention relates to a process of discovering mineral deposits by the determination of the distribution of electric currents and tensions in the earth, characterized by the fact that direct current, ordinary alternating current of low frequency, and high frequency alternating current, are simultaneously sent into the ground to be explored in superposition to each other and that the distribution of electricity in the ground is determined for each kind of current separately.

Claims allowed - 7.

248. _____Improved Apparatus for Electrically Exploring the Ground of Soil. British Patent 291025, issued Aug. 9, 1928.

This invention relates to an apparatus for completely measuring the electric and magnetic elements of the elliptically polarized electromagnetic field of the telluric currents in connection with electric earth exploration by means of alternating currents, comprising a measuring device adapted to be subjected to the action of an electromagnetic field under examination, and to be connected with a phase coupling line energized from the primary electric line feeding the ground with electricity characterized thereby that the phase coupling line is provided with a shunt connected with said phase coupling line in parallel to said measuring device, the shunt circuit being connected to earth and containing an alternating current resistance and means for resistance adjustment in a section of said shunt circuit between the points of connection with the earth conductor and with the phase coupling line.

Claims allowed - 4.

249. BILLOTE, LOUIS CHARLES (Revere, Mass.) AND LIPSON, EDWARD (Chelsea, Mass., assignors to Oil Finding Corporation, New York, N.Y.). Oil-Detecting Method. Canadian Patent 327865, issued Nov. 22, 1932.

Detects presence of oil or other dielectric deposits below surface of earth, which comprises applying high-frequency alternating current electrostatically to surface of earth between points remote from each other, short and long current paths thus formed being substantially in line and observing any difference between said currents, as indication of presence of such deposits, substantially as set forth.

Claims allowed - 14.

250. CHILSON, DANIEL GIPSON (of Post Office Box 1675, Clark Street, Jerome, Yavapai County, State of Arizona, U.S.A.). Improvements in or Relating to Location of Ore. British Patent 225727, issued Dec. 11, 1924.

This invention relates to a method of locating or exploring unknown bodies of ore consisting in applying a contact to the earth and a second contact to a known body of ore, connecting an alternating current producing device between said contacts, placing an electromagnetic wave detecting device at points distant from the point of contact with the known body of ore and determining the presence or absence of further bodies of ore adjacent such distant points by the intensity or direction, or both, of the electromagnetic field at those points.

Claims allowed - 6.

251. EDGE, ARTHUR BROUGHTON (Australia House, Strand, London, W. C. 2, England). Improved Apparatus for Determining the Nature of the Subsoil and for Detecting the Presence of Minerals, Metals, or Metalliferous Deposits. British Patent 364085, issued Mar. 23, 1931.

Refers to method and apparatus for determining nature of subsoil which comprises means for instantaneously comparing phase and potential differences in respect to currents flowing between any 2 pairs of 3 points in region of exploration.

Claims allowed - 4.

252. _____Improved Method of and Apparatus for Determining the Nature of the Subsoil and for Detecting the Presence of Minerals, Metals, or Metalliferous Deposits. Australian Patent 2353/31, issued Apr. 28, 1932.

Presents method of determining nature of subsoil which comprises passing alternating current through earth between distant or spaced earthed electrodes, producing exact balance in potential and phase between pairs of points in area through which current is passed and from a series of measurements of these potentials and phase angles along lines of traverse plotting potential and phase-variation curves upon a suitable chart. Apparatus for carrying out this method comprises a bridge or semibridge, in each of two ratio arms of which is arranged a suitable impedance, which may be a resistance, capacity, or inductance or any such combination arranged in series or in parallel or in series-parallel.

Claims allowed - 5.

253. _____Subsoil Prospecting Apparatus. Canadian Patent 345114, issued Oct. 9, 1934.

Apparatus for determining the nature of the subsoil and detecting or locating minerals, metals, or metalliferous deposits comprising means for transmitting current through the soil, exploring means for the instantaneous comparison of phase and potential differences at different points in the area under exploration, said exploring means being independent of wire connections to the current supply points which are permanently fixed during the exploration of a prearranged area.

Claims allowed - 6.

54. ERDA GESELLSCHAFT FÜR WISSENSCHAFTLICHE ERDERFORSCHUNG m. b. H (German Co.), AND DR. RICHARD AMBRONN (German Citizen both of Göttingen, Germany). Improvements in Devices for Detecting and Locating Masses of Dissimilar Electric Conductivity in the Earth. British Patent 181731, issued Sept. 17, 1923.

This invention relates to a device for detecting and locating masses of dissimilar electric conductivity in the earth by determining the distribution of the electric potential or the arrangement of the equipotential lines along the surface of the earth or along bore holes between electrodes which are supplied by a suitable source of current with unidirectional current or alternating current of arbitrary frequency, characterized in that the electrodes are formed so as to cover surfaces of suitable extension so as to avoid undesired crowding of the lines of flux adjacent the electrodes.

Claim allowed - 1.

255. ERDA MAATSCHAPPIJ VOOR WETTENSCHAPPELIJK AARDLAGENONDERSOEK (of 656 Prinsengracht, Amsterdam, Holland, Assignee of the "Erda" Aktiengesellschaft of Göttingen). Improvements in or Relating to Electrical Arrangements for Exploring the Subsoil. British Patent 210801. (The application for a patent has become void. Applicate date Feb. 4, 1924).

This invention relates to an electrical arrangement for determining equipotential lines in the magnetic field of a portion of subsoil traversed by an alternating current, comprising a current conductor the two ends (sounding members) of which are connected to the portion of subsoil to be explored, the said conductor having a measuring or indicating instrument and an induction coil.

Claims allowed - 5.

256. GEFFCKEN, RUDOLF HERMANN HEINRICH (of Stallbaumstrasse, Leipzig-Gohlis), RICHTER, RUDOLPH HANS (of 3 Wiederitzscherstrasse, Leipzig-Gohlis), WETZEL, MAX HUGO (of 28 Hauptstrasse Oetzsch, near Leipzig), AND WETZEL, MAX KURT (of 6 Bismarkstrasse, Leipzig) all in Germany. Improvements Relating to Devices for Locating Conducting Bodies Capable of Being Magnetized. British Patent 220283, issued Mar. 5, 1925.

This invention relates to a device for locating conducting bodies or bodies capable of being magnetized, by the frequency variation of oscillations, wherein at least two oscillation systems are coupled together and adjusted in such a manner that by the variation of the natural frequency of one of the oscillating systems considerable variations of the coupling frequency or the frequency of the ore oscillation present.

Claims allowed - 6.

257. GEFFCKEN, RUDOLF HERMANN HEINRICH (of 9 Stallbaumstrasse), AND RICHTER, RUDOLF HANS (of 3 Wiederitzscherstrasse, both in Leipzig-Gohlis, Germany). Improvements Relating to Devices for Locating Conducting or Magnetizable Bodies. British Patent 235526, issued June 17, 1926.

This invention relates to a device for locating conducting bodies or magnetizable bodies by their action on the oscillating condition of a valve generator, and wherein the variations of the anode or grid continuous current of the valve generator produced by this action serve for locating purposes, characterized by the fact that a circuit capable of oscillating and tuned substantially to resonance is coupled to the oscillating circuit of the generator.

Claims allowed - 5.

258. HAUSER & CO. (G. m. b. H., Frauentorstrasse F. 9-12, Augsburg, Germany) AND OSTERMEIER, JOHANN BAPTIST (Hans-Sachsweg, 6 Mering, near Augsburg, Germany). Improvement in and Relating to Methods and Apparatus for Locating Ore and the Like. British Patent 397314, issued Aug. 24, 1933.

Relates to method of investigating subaqueous mineral deposits, conducting masses of mineral deposits, or conducting masses in moist media, and includes steps of submerging two electrodes of electrochemically equivalent conducting material, connected through a circuit containing a current of potential-difference-detecting instrument, in water or medium, contacting ore electrode with mineral deposit whereby said instrument shows a deflection, and then applying to circuit a potential difference opposing that set-up between electrodes to reduce deflection of detecting instrument to zero and measuring on a separate measuring instrument applied potential difference or a factor dependent thereon.

Claims allowed - 12.

259. HERR, SHIRL (Crawfordsville, Ind., U.S.A., inventor), AND ABBOTT, RAYMOND B. (Lafayette, Ind., U.S.A., assignee of one half interest). Canadian Patent 340828, issued Apr. 10, 1934.

Relates to method of prospecting underground regions from surface of earth to locate buried objects, of producing magnetic field by passing electric current through a primary coil set up in initial position, setting up a detecting coil at a substantial distance from primary coil and in a position relative to said primary coil where minimum current will be induced in detecting coil, of transferring said primary coil and said detecting coil to points in territory to be prospected, said two coils being set up at each point in same relative positions in respect to each other, as was determined by initial minimum setting, and observing current output of each setting.

Claims allowed - 3.

260. KARCHER, JOHN C. (Dallas, Tex., assignor to Geophysical Service, Inc.). Borehole-Exploring Apparatus. Canadian Patent 340260, issued Mar. 20, 1934.

Relates to method for continuously exploring borehole during drilling; it consists in causing electric current to flow through conductor insulated from drill stem of hole-drilling mechanism and connected to drill bit to cause current to flow from drill bit into earth from which said current is collected and then causing current to pass through measuring instruments for observation.

Claims allowed - 7.

261. LÖWY, HEINRICH (of Zieglergasse 1, Vienna, VII, Austria). Improvements in Aircraft for Electrically Prospecting for Minerals or Water. British Patent 156696, issued Apr. 7, 1922.

This invention relates to the means for electrically prospecting for minerals or water comprising in combination a flying vehicle with an antenna carried by the said flying vehicle, said antenna being maintained at a constant position with respect to both the vehicle and the ground and forming an open oscillator capable of being used for measuring purposes.

Claim allowed - 1.

262. _____Method for Exploring the Earth's Crust. British Patent 287053. (The application for a patent has become void. Application date, Mar. 6, 1928).

This invention relates to a method for exploring the earth's crust characterized in that for univocally determining the configuration of the main constituents of the earth's crust at least two electric quantities are measured of which the one (natural wave length of an electric oscillating circuit, reflection angle position of an extreme interference value) depends if there are conductive surfaces only of their distance and the other (damping constant or oscillation amplitude of the oscillation circuit) depends also of their nature in such a characteristic matter that to each different configuration of the said main constituents corresponds a different combination of the values of the electric quantities.

Claims allowed - 7.

263. LUNDBERG, HANS FORKEL FREDERIK (of Villa Malet, Lidingö Villasted, Sweden) AND NATHORST HARRY JOHAN HJALMAR (of 17A Västmannagatan, Stockholm, Sweden). Apparatus for Discovering and Determining Electrically the Location of Veins of Ore or Mineral. British Patent 129621, issued Feb. 26, 1920.

This invention relates to the apparatus for discovering and determining electrically the location of veins of ore or mineral by means of two primary electrodes adapted to be brought into contact with the soil and connected with a source of electric current, and two secondary electrodes, so called searching rods, connected with a sensitive receiving apparatus, for instance a telephone receiver, and adapted to be brought into contact with the soil at different points between the primary electrodes, characterized by this that one or both of said primary electrodes have a considerable extension in horizontal direction in proportion to the distance between said primary electrodes so as to contact with the soil either along a continuous straight or curved line or at a plurality of points on such a line.

Claims allowed - 2.

264. LUNDBERG, HANS TORKEL FREDERIK (of 35 Vintervagen, Räsunda, Sweden). Apparatus for Detecting Electrically the Location of Ores and the Like. British Patent 214206. (The application for a patent has become void. Application date, Mar. 4, 1924).

This invention relates to an apparatus for discovering electrically the location of ores and the like, comprising a primary circuit including an oscillatory circuit or current-carrying loop for generating strong magnetic oscillations or alternating magnetic fields, and a secondary circuit including a receiving apparatus for ascertaining anomalies in the field generated, characterized by that certain portions of the oscillatory circuit or current-carrying loop of the primary circuit are encased with iron.

Claims allowed - 5.

265. _____Apparatus for Locating Ores Electrically. British Patent 223540. (The application for the patent has become void. Application date, Aug. 22, 1924).

This invention relates to an apparatus for investigating electrically the nature of the soil, in order to discover and determine the location of ores and the like, by the aid of a current-carrying loop by means of which currents are generated in the soil by induction, characterized by this that the loop has a very elongated shape with such small width as to be negligible in proportion to its length.

Claims allowed - 5.

266. MASON, SLICHTER, AND HAY (a Copartnership consisting of Max Mason, Louis B. Slichter, Donald L. Hay, and Donald C. Slichter, assignee of Donald L. Hay, of Madison, Wis., U.S.A.). Subsoil Nature Determining Method. Canadian Patent 344586, issued Sept. 11, 1934.

The method of determining the nature of the subsoil of a tract which comprises generating an electromagnetic field having its axis extending above said tract and subsequently parallel to the surface thereof, and measuring directly the electromagnetic field near said axis.

Claims allowed - 2.

267. MINES DOMANIALES DE POTASSE D'ALSACE (of 9 Boulevard du Maréchal Pétain, Mulhouse, (Haut-Rhin), France). Process and Means for Geological Examinations for Studying and Exploring the Subsoil. British Patent 335051, issued Sept. 18, 1930.

This invention relates to a process of geological examination permitting of studying and exploring the subsoil, characterized in that the resistance of the earth is measured between two electrodes placed in the earth, arranged in series in a circuit comprising likewise in series a source of alternating current and a voltmeter of known internal resistance, each passage of the current giving on the voltmeter a maximum reading which allows of calculating the resistance desired.

Claims allowed - 3.

268. NICHOLS, CHARLES RODNEY, AND WILLISTON, SAMUEL HATHAWAY (Dallas, Tex., U.S.A.). Electrical Prospecting Method. Canadian Patent 328563, issued Dec. 20, 1932.

Covers method of electrical prospecting. Creates electric current flow through earth between separated earth-energization points so as to impress a readily identifiable potential condition or characteristic on a portion of earth's surface which occupies, or is displaced from, a definite predeterminable geographical location as potential at earth's surface in proximity to said location is or is not significantly affected by changes in distribution of current flow through earth produced by earth body or bodies of different conductivity from adjacent earth. Determines extent and direction of displacement, if any, of said surface portion from said position.

Claims allowed - 28.

269. PIEPMEYER AND CO. KOMMANDITGESELLSCHAFT (a German Company), AND GELLA, NORBERT (a citizen of Austria, both of Rasenallee, 13, Cassel-Wilhelmshöhe, Germany). Apparatus for Detecting and Determining the Position of Stretches of Underground of Different Electric Conductivity. British Patent 241251, issued Oct. 12, 1925.

This invention relates to a coil movable in any desired direction for determining the position of stretches of underground of different electric conductivity by sending electric currents through the ground, characterized by the fact that clamping means are provided by which either of the two axles of the coil which are disposed at right angles to another, can be fixed at right angles to one another, can be fixed so that by securing one axle the coil can be moved about the other axle and vice versa, in order to quickly and safely determine, by means of current measuring apparatus connected with the coil the field produced by the electric currents according to strength and direction.

Claim allowed - 1.

270. SCHLUMBERGER, CONRAD (Paris, France). Geological Formation Determining Apparatus. Canadian Patent 324702, issued Aug. 2, 1932.

Refers to electrical process and apparatus for determining nature of geological formations traversed by drill holes. It consists in measuring electrical specific resistivity of formations encountered at different depths inside drill hole and in its uncased parts.

Claims allowed - 3.

271. _____Oil-Bearing-Formation Locating Apparatus. Canadian Patent 324701, issued Aug. 2, 1932.

Covers method of locating oil-bearing formations which consists in sending a current into soil by means of insulated line grounded at both ends and having source of electric energy connected between said grounds; then measuring intensity of current and difference of potential between plurality of points on surface of soil, whose precise location with respect to grounded ends of the line is exactly surveyed; and calculating from above data specific conductivity of layers of soil at different depths, thereby determining areas of maximum electric conductivity corresponding to points of maximum salinity of said oil-bearing soil.

Claim allowed - 1.

272. SCOTT, FREDERICK GILBERT LAUGHTON (London, England). Improvements in Electrical Apparatus for Geophysical Surveying. British Patent 381695, issued June 17, 1932.

Relates to improvements in apparatus for geophysical surveying by electrical method, wherein electric impulses are passed through the area being surveyed, and distribution of such impulses throughout such area is determined by aid of telephonic receiver -- for instance, connected to exploring earth pins or to exploring inductive loop -- and presence of orebodies is deduced by departure of such distribution from normal.

Claims allowed - 2.

273. SWEDISH AMERICAN PROSPECTING CO., (New York City, assignee of Hans T. F. Lundberg and Folke H. Kilstedt, coinventors, both of Massapequa, N.Y.). Electrical Prospecting Method. Canadian Patent 343635, issued July 31, 1934.

This invention relates to a method of electrical prospecting. The steps comprise flooding a profile of a tract under investigation with current supplied from one side of the profile, moving a ground current receiving network across the profile and taking readings from point to point; then flooding the profile with current supplied from the opposite side of the profile, and again moving the ground current receiving network across the profile and taking readings from point to point.

Claims allowed - 6.

274. TINSLEY, HENRY, GALL, DOUGLAS CRISP (Werndee Hall, South Norwood, London, England), AND EDGE, ARTHUR BROUGHTON (Australia House, Strand, London, W. C. 2). A New Method of Electrical Geophysical Prospecting and Surveying and Apparatus for Use Therein. British Patent 378056, issued July 26, 1932.

Relates to method for determining nature of subsoil and for detecting presence of minerals, metals, and metalliferous deposits. Alternating current is applied to area in question by means of ground electrodes and a current-carrying loop to determine, first, a series of lines of equal inphase potential by means of apparatus comprising a pair of portable ground electrodes connected in circuit with means for indicating potential difference (portable ground electrode circuit includes a coil which can be orientated to pick-up quadrature potential from the electromagnetic field to balance out any quadrature potential while points of equal inphase potential are being located on lines); and second, a series of lines of equal quadrature potential with respect to first series of lines by means of apparatus capable of indicating potential differences. Those two series of lines are plotted, and information desired is determined therefrom.

Claims allowed - 21.

5. Radioactive Method

75. KOLHÖRSTER, WERNER (Berlin-Friedenau, Germany). A Process for Determining the Potassium Content in Spaces Containing Potassium. British Patent 340231, issued Dec. 12, 1930.

Relates to device for determining potassium content in spaces which contain potassium compounds in any state of aggregation whatsoever, comprising tubular ionization vessel with electrode passing through it, and having a potential of about 1,000 volts or upward set up between these two parts. Ionization vessel is affected by gamma radiation emitted by potassium, so that, owing to high potential difference between outer wall and inner electrode, intense ionization by collision is set up so that each incoming ray produces, in an outer circuit, current shocks of such intensity that they are recorded on a recording strip either directly or after amplification has taken place, or are added up by a counting device.

Claim allowed - 1.

GERMAN PATENTS

1. Gravitational Methods

276. **ASKANIA-WERKE AKTIENGESELLSCHAFT** (formerly Centralwerkstatt Dessau) AND BAMBERG-FRIEDENAU, CARL (Berlin-Friedenau, Germany). Drehwage (Torsion Balance). German Patent 394876, issued Apr. 29, 1924.

Consists of making time during which oscillating beam comes to rest adjustable according to circumstances. Damping device serving for this purpose is described.

Claims allowed - 2.

277. _____ Drehwage (Torsion Balance). German Patent 452040, issued Nov. 3, 1927.

Discloses combination of torsion balance with theodolite. Theodolite may be secured to torsion balance either between two casings of two balance beams or above common casing in which two beams are enclosed. Torsion balance can easily be removed and theodolite used separately.

Claims allowed - 4.

278. _____ Drehwage (Torsion Balance). German Patent 456039, issued Feb. 15, 1928.

Devises system of damping by means of electromagnets; arrangement for producing damping magnetic field is connected with torsion-balance box; weight fixed to horizontal arm serves as brake copper. Copper weight has form of parallelepiped, longitudinal axis of which is perpendicular to axis of beam.

Claims allowed - 3.

279. _____ Drehwage (Torsion Balance). German Patent 478359, issued June 24, 1929.

Presents improvement of invention described in original patent 456039. Improvement concerns annihilation of effect of magnetic remanence upon brake copper after closing of circuit by which results of measurements are influenced.

Claims allowed - 4.

280. _____ Drehwage mit mehreren das Gehänge umgebenden Schutzkästen (Torsion Balance with Several Protecting Casings Surrounding the Suspension Device). German Patent 536306, issued Oct. 22, 1932.

Provides improvement by which air, at least between two inner casings surrounding suspension device, is put in constant circulation. In this manner an irregular heating of most inner protecting casing is avoided.

Claims allowed - 5.

281. _____ Drehwage nach Eötvös (Torsion Balance According to Eötvös). German Patent 550009, issued May 10, 1931.

Relates to torsion balance of Eötvös in which measurement of rest position of suspension device in various azimuths to which balance is successively adjusted takes place by a device inserted in path of light rays to deflect nonoscillating light rays.

Claims allowed - 4.

282. ASKANIA-WERKE AKTIENGESELLSCHAFT (formerly Centralwerkstatt Dessau) AND BAMBERG-FRIEDENAU, CARL (Berlin-Friedenau, Germany). Drehwage nach Eötvös (Torsion Balance According to Eötvös). German Patent 565847, issued Dec. 6, 1932.

Covers torsion balance with more than one hanging device (Gehänge). Each hanging device is secured in a special part of casing. Parts are interchangeable and are fixed at sides of a central body, which contains optical and reading and registering devices.

Claims allowed - 12.

283. _____ Drehwage zur Messung der Schwerkraft (Torsion Balance for Measuring Gravity). German Patent 396181, issued May 27, 1924.

Describes invention in which beam of balance is made of a new form, so that one of weights is disposed below and other above horizontal plane passing through point of suspension. By this arrangement height of instrument can be reduced.

Claims allowed - 3.

284. _____ Drehwage zur Messung der Schwerkraft (Torsion Balance for Measuring Gravity). German Patent 451477 (addition to Patent 396181), issued Oct. 27, 1927.

Original patent 396181 discloses invention in which weights are fixed to ends of beam, one below and other above a horizontal plane passing through point of suspension of beam. Invention concerns means by which rotation of beam around its own axis, thus causing titling of perpendicular rods to one or other side, is prevented.

Claims allowdd - 7.

285. _____ Eötvössche Drehwage (Eötvös Torsion Balance). German Patent 378323, issued July 10, 1923.

Applies to arrangement by which locking device and trip-gear mechanism serving for rotation of balance are connected to a braking or locking device of driving mechanism in such a way that both work simultaneously, causing driving mechanism to stop as soon as rotation of instrument is locked.

Claims allowed - 2.

286. _____ Eötvössche Drehwage (Eötvös Torsion Balance). German Patent 395397, issued May 16, 1924.

Presents arrangement in which influence of changes of temperature and of radiation is removed by filling external casings protecting balance with soft feathers; these casings serve to protect balance during transportation.

Claims allowed - 4.

287. _____ Eötvössche Drehwage (Eötvös Torsion Balance). German Patent 453438 (addition to Patents 343620 and 372133), issued Dec. 6, 1927.

Concerns improvement of recording apparatus described in patents 343620 and 372133. To prevent obscurity of reading caused by interference of two light rays reflected by mirrors, a special arrangement is made by which one of light rays is screened at moment when other ray is used for taking indication.

Claims allowed - 4.

288. ASKANIA-WERKE AKTIENGESELLSCHAFT (formerly Centralwerkstatt Dessau) AND BAMBERG-FRIEDENAU, CARL (Berlin-Friedenau, Germany). Eötvössche Drehwage (Eötvös Torsion Balance). German Patent 555623, issued July 28, 1932.

Refers to torsion balance according to Eötvös, especially to that with inclined beam. Invention is characterized by arrangement preventing deflection of light rays in case of small oscillations of beam about its main axis of inertia.

Claims allowed - 4.

289. _____ Koinzidenzapparat zur Pendelbeobachtung (Coincidence Apparatus for Pendulum Observations). German Patent 511838, issued Nov. 4, 1930.

Describes coincidence apparatus for pendulum observations in which immovable light-ray thrown upon pendulum is reflected at fixed intervals by means of a movable element, is characterized by arrangement in which movable element forms one part of comparison watch or is directly connected with one of movable parts of latter.

Claims allowed - 3.

290. _____ Gehänge für Eötvösche Drehwaagen (Suspension systems of Eötvös Torsion Balances). German Patent 609646, issued Feb. 19, 1935.

This invention relates to the suspension systems of the Eötvös torsion balances, especially to those with inclined beams. Here the beam is not fixed rigidly to the poles carrying the mirror or the prism but may oscillate.

Claims allowed - 3.

291. DITTMANN, DR.-ING. KURT EMIL (Gelsenkirchen, Germany). Platten Kondensator zum Bestimmung von Massengravitationswirkungen (Plate Condenser for Determining the Gravitational Effects of Masses). German Patent 428499, issued May 14, 1926.

Describes plate condenser assigned for determining the excess or deficiency of mass under the ground or within other bodies; invention is characterized by making condenser rotatable around a horizontal and a vertical axis so that it can be adjusted to any position of angle; direction, as well as various strengths of effects by which movable condenser plate is influenced according to laws of mass attraction, can be measured.

Claim allowed - 1.

292. "ERDA" AKTIENGESELLSCHAFT, INSTITUT FÜR ANGEWANDTE GEOPHYSIK (Göttingen, Germany). Drehwage (Torsion Balance). German Patent 421727, issued Nov. 17, 1925.

Applies to arrangement by which damping of oscillation of beam is obtained by using air; for this purpose, weights are placed between two damping plates. The position of these plates, thus amount of damping, can be regulated by means of special guide screws.

Claims allowed - 4.

293. _____ Eötvössche Drehwage (Eötvös Torsion Balance). German Patent 418348, issued Aug. 31, 1925.

Applies to patent characterized by suspension of beam to unicrystal filament - for example, tungsten wire.

Claim allowed - 1.

294. ASKANIA-WERKE AKTIENGESELLSCHAFT (formerly Centralwerkstatt Dessau) AND BAMBERG-FRIEDENAU, CARL (Berlin-Friedenau, Germany). Torsionsaufhängung (Torsion Suspension). German Patent 421726, issued Nov. 17, 1925.

Covers torsion suspension as follows: Filament passes through hollow cylinder made from soft metal - for example, lead; cylinder is inserted into clamping screw; suspension wire can be held fast by applying screw.

Claim allowed - 1.

295. "EXPLORATION" BODEN-UNTERSUCHUNGS UND VERWERTUNGS G. m. b. H. (Berlin, Germany). Drehwage für Ausführung von Schwermessungen (Torsion Balance for Carrying Out Gravity Measurements). German Patent 440384, issued Feb. 17, 1927.

Torsion balance proposed by inventor is characterized by placing rotative driving mechanism, to preserve symmetrical distribution of mass of instrument, in a central position - for example, inside cylinder of foot.

Claim allowed - 1.

296. _____ Drehwage mit zwei Gehangen (Torsion Balance with Two Suspensions). German Patent 482886, issued Sept. 26, 1929.

Concerns arrangement by which two beams of torsion balance form one with another an angle of 90° or of nearly 90°.

Claim allowed - 1.

297. _____ Drehwage zur Messungkleiner Gravitationskrafte (Torsion Balance for Measuring Small Forces of Gravity). German Patent 463128, issued July 24, 1928.

Covers invention in which one of two weights of balance is secured to rigid rod directed upward, other weight remaining as usual at end of balance beam. By this arrangement total height of instrument is considerably reduced.

Claims allowed - 2.

298. _____ Drehwage zur Messung kleiner Gravitationskrafte (Torsion Balance for Measuring Small Forces of Gravity). German Patent 463673, issued July 31, 1928.

Discloses further improvement of original patent 463128, which is characterized by lowering center of gravity of system by securing special weight below center of balance beam. This arrangement makes it possible to reduce still more total height of balance.

Claims allowed - 2.

299. _____ Drehwage zur Messung von Schwerkraftsunterschieden (Torsion Balance for Measuring Variations in Gravity). German Patent 467704, issued Oct. 29, 1928.

Describes torsion balance constructed so that two horizontal bars to which weights are secured are connected with one another by vertical cross arm. This cross arm is suspended to wire directly or by means of a lateral additional piece. Connecting arm can be made from a tube and suspension wire placed inside of tube; center of gravity can be lowered by fixing a special weight to connecting arm or to lower arm.

Claims allowed - 5.

300. ASKANIA-WERKE AKTIENGESELLSCHAFT (formerly Centralwerkstatt Dessau) AND BAMBERG-FRIEDENAU, CARL (Berlin-Friedenau, Germany). Einrichtung zur Messung kleiner Krafte (Arrangement for Measuring Small Forces). German Patent 416319, issued July 11, 1923.

Applies to measuring of small forces by means of a balance beam fastened rigidly to a torsion filament by following special arrangement: Beam is fixed to the upper part of filament; lower part of torsion filament is secured to a rod, ends of which are inserted into special guides allowing rod to be moved vertically only. Same rod serves to keep filament tight.

Owing to this arrangement height of whole instrument is reduced considerably.

Claims allowed - 3.

301. _____ Verfahren zur Bestimmung der Anziehung von Massen, insbesondere der Erdanziehung (Method for Determining the Attraction of Masses, Especially That by the Earth). German Patent 432130, issued July 28, 1926.

Discloses following method for determining attraction of masses. A system of bodies of masses is enclosed in a box provided with a pressure meter. System is subject to changes of position, if force of attraction under effect of which masses of system are is changed. System is then brought to its original position by change of density of medium in which system is inclosed. Value of this variation of density can be established by means of a pressure-meter and serves as a basis for determining change of force of attraction.

Claims allowed - 3.

302. _____ Vorrichtung zum Beobachtung der Änderung einzelner Schwerkraftskomponenten mittels elektrischer Plattenkondensatoren (Apparatus for Observing the Change of Single Gravity Components by Means of Electrical Plate Condensers). German Patent 430643, issued June 21, 1926.

Describes apparatus for observing change of single gravity components by means of electrical plate condensers. It consists of one or several condensers so suspended that they occupy a position eccentric with regard to a vertical or horizontal axis of rotation.

Claim allowed - 1.

303. GAWRON, ALFRED (Berlin-Wilmersdorf, Germany). Temperaturschutz für Messinstrumente aller Arta (Temperature Protection for Measuring Instruments of All Kinds). German Patent 436592, issued Nov. 4, 1926.

Discloses special method of temperature protection; protection consists of several separated covers having a form corresponding to parts of torsion balance or of any other measurement instrument. Covers are made from waterproof material and provided with openings through which observations can be made without removing covers.

Claim allowed - 1.

304. GESELLSCHAFT FÜR PRAKTISCHE GEOPHYSIK m. b. H. (Freiburg, Breisgau, Germany). Einrichtung zur Messung von Winkelausschlagen (Arrangement for Measuring Angles of Deflection). German Patent 385787, issued Dec. 12, 1923.

Describes arrangement for measuring angles of deflection by means of a mirror and a graduation scale in geophysical-survey instruments, such as torsion balances, in which graduation scale is fixed to telescope above tube; a cutaway section of telescope tube in front of objective makes possible passage of light rays, emanating from scale through objective to mirror and back to eye.

Claims allowed - 2.

305. _____ Gravitationswage nach derjenigen von Eötvös (Torsion Balance of Eötvös Type).

Covers torsion balance of Eötvös type by which variability of twisting force is eliminated by producing in torsion balance directing forces based on magnetic, electrical, or mass attraction. By this external influence upon suspension fiber - for example, that of temperature - is also excluded.

Claims allowed - 2.

306. _____ Verfahren zur Beseitigung störender der Wandungshohlräume u. dgl. bei Benutzung der Drehwage unter Tage (Method for Eliminating Disturbing Hollow Spaces in Walls in Using the Torsion Balance Underground). German Patent 443215, issued Apr. 23, 1927.

Discloses method for eliminating hollow spaces in walls of mines owing to their harmful effect on measurements made under ground by torsion balance. Inventor recommends filling out these hollow spaces with material the density of which corresponds to that surrounding the hollow space. Sacks filled with such material may be used.

Claims allowed - 2.

307. _____ Verfahren zur Beseitigung störender Wandungshohlräume und dgl. bei Benutzung der Drehwage unter Tage (Method for Eliminating Disturbing Hollow Spaces in Walls in Using the Torsion Balance Underground). German Patent 443299, issued Apr. 23, 1927.

Addition to original patent 443215. Concerns filling out of hollow spaces in walls in working with torsion balance underground. Inventor states that filling can be made not only in form of plane surfaces, as recommended in original patent, but also in any other form for which gravity effect may easily be calculated, as for example, form of a cylinder.

Claim allowed - 1.

308. _____ Vorrichtung zur Bestimmung der Änderung der Vertikalkomponente der Attraktionskraft in der Vertikalrichtung (Device for Determining the Variation of the Vertical Component of Gravity of the Force of Attraction in the Vertical Direction). German Patent 448003, issued Aug. 6, 1927.

Consists chiefly of a beam kept in horizontal position by means of a horizontal wire; weights are suspended to ends of beam at different heights. Local variation of vertical component of gravity is manifested by inclination of beam and measured by means of a mirror and a telescope. Two beams may be secured to same wire or to two wires, weights of two beams being fixed at opposite heights; both beams are provided with mirrors.

Claims allowed - 3.

309. HAFF, GEBRÜDER, GESELLSCHAFT m. b. H. (Pfronten-Ried, Germany). Einrichtung zum Einstellen des Asimuts bei Drehwagen (Device for Adjusting the Azimuth at the Torsion Balance). German Patent 458555, issued Apr. 13, 1928.

To adjust a torsion balance to various azimuths, ordinary stop screws or a ring provided with cuttings are generally used. This requires troublesome operation, if, for example, five azimuths instead of three are to be taken. This disadvantage is according to this patent removed by applying two or several rings provided with cuttings which are fixed to a tube and can be displaced in vertical direction.

Claims allowed - 2.

310. _____ Vorrichten zur Abbringung von Basislinien auf den Photogrammen während der photographischen Registrierung bei Drehwagen (Device for Drawing Base Lines on Photograms Obtained in Torsion Balances During Photographic Recording). German Patent 480443, issued Oct. 17, 1929.

Covers device for drawing base lines on photograms characterized by securing a special immovable lever, provided with a sharp point. By means of light pressure the point is pressed against the photographic surface and draws a fine line on it, owing to the movement of this surface.

Claim allowed - 1.

311. HAMMER, DR. WILHELM (Freiburg, Breisgau, Germany). Einrichtung zur relativen Schweremessung (Arrangement for Relative Gravity Measurement). German Patent 391777, issued Mar. 11, 1924.

Discloses arrangement in which periods of oscillation of two or more pendulums assigned for relative gravity measurements are transmitted by radio. According to this invention, the pendulums, periods of oscillation of which are to be compared, are connected to oscillatory circuits, emission of waves of which during an oscillating phase of pendulums is suddenly changed; this makes possible noting coincidences at places of observation.

Claims allowed - 2.

312. HAUBOLD, DR. WILHELM (Gottingen, Germany). Vorrichtung zur Bestimmung der Geländekorrektion bei Messungen des horizontalen Schweregradienten und der Krummungsgrossen der Potentialflächen (Arrangement for Determining the Topographic Correction During the Measurements of the Horizontal Gravity Gradient and of the Curvature Values of the Potential Surfaces). German Patent 575627, issued May 3, 1933.

Relates to arrangement for determining topographic correction during measurement of horizontal gravity gradients and of curvature values of potential surface with aid of Eötvös torsion balance. Arrangement consists of application of a horizontal lath provided with special graduation.

Claims allowed - 5.

313. HAUSER & CO., GESELLSCHAFT m. b. H. (Augsburg, Germany). Statischer Schweremesser (Static Apparatus for Gravity Measurements). German Patent 570778, issued Feb. 20, 1933.

Covers arrangement serving for improved temperature compensation. Apparatus consists of one or several force accumulators (Kraftspeicher) (for example, springs) which are exposed to absolute or relative weight of column of a liquid. Force accumulator is immersed partly or entirely in liquid, thus adopting temperature of latter.

Claims allowed - 2.

314. _____ Visuelle Ablesevorrichtung für Drehwagen (Visual Reading Device for Torsion Balance). German Patent 579433, issued June 26, 1933.

Applies to torsion balances in which ocular of reading device is arranged at about half eye-distance from perpendicular plane determined by line connecting weights of two loads, optical axis of reading device being parallel to this plane.

Claims allowed - 3.

315. HECKMANN, KÄTE (Freiburg, Breisgau, Germany). Metalldrahtaufhängung für Messinstrumente insbesondere für Drehwagen (Metal-Wire Suspension for Measuring Instruments, Especially for Torsion Balances). German Patent 428824, issued May 14, 1926.

Concerns metal-wire suspension for measurement instruments, especially for torsion balances, characterized by providing part of instrument enclosing suspension wire with a heating device which can be used for tempering suspension wire.

Claim allowed - 1.

316. KILCHLING, DR. KARL (Freiburg, Breisgau, Germany). Drehwage nach Eötvös (Torsion Balance of Eotvos Type). German Patent 458556, issued Apr. 13, 1928.

Describes arrangement by which torsion-balance box is suspended to a holder by a wire, thus making its special adjustment to horizontal position by means of levels unnecessary.

Claims allowed - 3.

317. _____ Verfahren für Schweremessungen nach Eötvös (Method for Gravity Measurements According to Eötvös). German Patent 427530, issued Apr. 9, 1926.

Concerns method of gravity measurements according to Eötvös in which torsion balance is rotated very slowly without interruption by means of a precision watch. During this constant mechanical rotation ocular or photographic observation can be made in as many azimuth positions as desired.

Claim allowed - 1.

318. _____ Verfahren für Schweremessungen nach Eötvös (Method for Gravity Measurements According to Eötvös). German Patent 432023, issued July 28, 1926.

Differs from original patent 427530 by arrangement in which only suspended part is rotated and deviation of attraction is observed, with regard to azimuth of rotation, during rotation.

Claims allowed - 4.

319. KILCHLING, DR. KARL (Freiburg, Breisgau, Germany). Verfahren für Schweremessungen nach Eötvös (Method of Gravity Measurements According to Eötvös). German Patent 432185 (addition to Patent 427530), issued July 28, 1926.

Addition to patent 427530. Covers invention by which a light ray is rotated with torsion balance; ray records deviation of attracted suspended part with regard to azimuth of uniform rotation. Recording is produced in form of a curve or light ray is exposed by a mechanical device at fixed periods of time so that it serves as a time signal by which elements of movement of rotation of suspended part are recorded.

Claims allowed - 3.

320. _____ Verfahren zur Verstärkung der Drehwagenausschläge durch Resonanz (Method for Amplifying Deflections of the Torsion-Balance Beam by Resonance). German Patent 428500, issued May 5, 1926.

Concerns an arrangement by which period of time of uniformly rotating balance and torsion oscillation of suspension are mutually adjusted.

Claim allowed - 1.

321. KOENIGSBERGER, DR. JOHANN (Freiburg, Breisgau, Germany). Gehängeklemmvorrichtung für Torsions Instrumente (Locking Device for the Suspension Parts of Torsion Instruments). German Patent 437215, issued Nov. 19, 1926.

Describes construction of locking device in which suspension wire remains stretched after instrument is locked for transportation. By this arrangement, which consists of applying a spring producing a force almost equal to that of weight of mass, change of position of zero point after unloading of instrument is prevented.

Claim allowed - 1.

322. _____ Messinstrument mit Flüssigkeits-Dämpfung (Measuring Instrument with Liquid Damping). German Patent 441882, issued Mar. 16, 1927.

Makes suspension wire of damping body thinner at place where it crosses surface of liquid; by this effect of surface tension is lessened considerably.

Claim allowed - 1.

323. _____ Verschluss für Flüssigkeits Dämpfungsgefäss (Device for Closing Liquid-Damping Receptacle). German Patent 453720, issued Dec. 15, 1927.

Consists of one or several iris diaphragms and a rubber ring through which wire passes. By closing diaphragm rubber ring is compressed, thus preventing the flowing out of the liquid.

Claims allowed - 2.

324. _____ Vorrichtung zur Vermeidung des Klebens der Gehängerei Messinstrumenten, besonders Drehwagen (Arrangement for Avoiding the Adhesion of the Suspension Part in Measuring Instruments, Especially Torsion Balances). German Patent 432598, issued Aug. 7, 1926.

Discloses means for preventing suspension part of a measuring instrument from adhering to other parts with which it makes contact during its oscillation; this result is attained by making parts which come in contact from hard oxides or sulphides on the one hand and from metals or metallic alloys on the other; owing to this arrangement parts which come in contact, instead of adhering, repel each other.

Claim allowed - 1.

325. KOGBETLIANTZ, ERVAND (Paris, France). Drehwage für gravimetrische Untersuchungen (Torsion Balance for Gravimetric Investigations). German Patent 467248, issued Nov. 13, 1928.

Applies to torsion balance provided with three beams secured at equal angles one to another and suspended to a common wire.

Claims allowed - 3.

326. QUIRING, DR. ING. HEINRICH (Falkensee b. Spandau, Germany). Drehwage zur Feststellung nutzbarer Lagerstätten (Torsion Balance for the Determination of Ore Deposits). German Patent 423312, issued Dec. 24, 1925.

Includes arrangement by which deflections of balance beam are established by magnetic or electrical potential differences occurring between balance beam, suspension wires of weights, and weights on the one side, and nonconductors or conductors of form of a tube, ring, box, or plate inclosing them on the other side.

Measurements of deflections of beam are made by means of a plate condenser.

Claims allowed - 2.

327. _____ Verfahren und Vorrichtung zur Feststellung nutzbarer Lagerstätten und sonstiger Schwerestörungen durch Lotabweichungen (Method and Apparatus for Locating Useful Deposits and Determining Gravity Disturbances by Means of Plumb-Line Deviations). German Patent 429034, issued May 17, 1926.

Describes method by which plumb-line deviations are determined by measuring electrical or magnetic potential differences between plumb line and conducting or nonconducting body surrounding it. This body may have a form of a sphere, cylinder, ring, or plate or have a convex shape. Ring or cylinder is divided into segments, each representing a plate condenser.

Claims allowed - 3.

328. REEH, REINHARD (Nanzebach, near Dillenburg, Germany). Fadenlose Aufhängung von Drehwagen, horizontal Pendeln, Magnetoscopen, und dgl. (Wireless Suspension of Torsion Balances, Horizontal Pendulums, Magnetoscopes, and Similar Instruments). German Patent 441505, issued Mar. 10, 1927.

Describes wireless suspension of torsion balances, etc., accomplished by means of a swimmer immersed in a liquid; invention is characterized by such a choice of liquid, of inclination, and of nature of surface parts of swimmer and of walls of receptacle at level of liquid, that two different menisci are formed in circular space between immovable receptacle and movable swimmer.

Claims allowed - 10.

329. RYBAR, DR. STEFAN (Budapeste, Hungary). Drehwage nach Eötvös (Torsion Balance of Eötvös Type). German Patent 458354, issued Apr. 4, 1928.

Covers torsion balance of Eötvös type with photographic registering device. Improvement concerns arrangement by which sensitive plates are secured below measuring pendulum.

Claims allowed - 3.

330. FYBÁR, DR. STEFAN, AND PEKÁR, DR. DESIDER (Budapeste,Hungary). Verfahren und Vorrichtung zur Behebung der durch rasche Temperaturveränderung hervorgerufenen störenden Wirkungen bei Eötvösscher Drehwage (Method and Arrangement for Eliminating Disturbing Effects upon Eötvös Torsion Balance Caused by Quick Changes of Temperature). German Patent 528187, issued June 26, 1931.

Concerns arrangements by which air currents producing disturbing effects within instrument are conducted by means of movable "directing surfaces" secured along beam in such a way that state of equilibrium of torsion balance is not affected by these air currents.

Claims allowed - 4.

331. SCHWEYDAR, DR. WILHELM (Potsdam, Germany). Gravitations-messer zur Messung des vertikalen Gradienten der Erdschwere (Gravity Measuring Instrument for Measuring the Vertical Gradient of Gravity). German Patent 456484, issued Feb. 25, 1928.

Concerns apparatus for measuring vertical gravity gradient which is based on comparison of bifilar twisting moment of gravity with torsion moment of a spiral spring. To eliminate influence caused upon length of spiral spring by temperature changes this patent discloses an arrangement in which spiral spring is replaced by a wire, upper end of which is carried by a balance beam brought to horizontal position by means of a counterweight.

Claims allowed - 3.

332. SEISMOS GESELLSCHAFT m. b. H. (Hanover, Germany). Horizontalpendeldrehwage (Horizontal-Pendulum Torsion Balance). German Patent 432022, issued July 22, 1926.

Applies to horizontal pendulums (for example, of Hengler's type) for gravity field investigations. Detailed description of apparatus is given. To reduce time of observation, two apparatus placed opposite one another may be used.

Claims allowed - 4.

333. _____ Verfahren zur Untersuchung der räumlichen Dichteverteilung im Erdinnern (Method for Investigation of Spatial Distribution of Density Inside the Earth). German Patent 441170, issued Mar. 1, 1927.

Proposes to obtain greater accuracy in investigating - for example, by torsion balance - of spatial distribution of density in surroundings of galleries and workings of mines and determining position of ore deposits the density of which differs from the surroundings, by bringing center of gravity of suspension part of instrument to that point of cross-section of gallery in which forces of attraction of parts of masses mutually compensate each other.

Claims allowed - 2.

334. ZEISS, FIRMA CARL (Jena, Germany). Apparat zum Messen der Schwerkraft (Apparatus for Measuring Gravity). German Patent 584256, issued Sept. 16, 1933.

Relates to apparatus for measuring gravity by determining period of oscillation of several pendulums arranged in a common case provided with means for lifting and locking them inside.

Claims allowed - 4.

335. ZEISS, FIRMA CARL (Jena, Germany). Pendel für Schweremessungen (Pendulum for Gravity Measurements). German Patent 567699, issued Jan. 7, 1933.

Applies to pendulum for gravity measurements within which is fixed a temperature-equalization body, the coefficient of expansion of which is greater than that of body of pendulum. This equalization body, length of which is about one half that of pendulum, is soldered to screw secured at bottom of pendulum.

Claim allowed - 1.

336. _____ Pendel, insbesondere für Schweremessungen (Pendulum, Especially for Gravity Measurements). German Patent 571680, issued Mar. 3, 1933.

Relates to pendulum, especially for gravity measurements, provided with adjustment screws, axes of which are situated in a plane parallel to the knife-edge of pendulum. Desired adjustment is accomplished by choice of screw length.

Claims allowed - 5.

2. Magnetic Methods

337. AMBRONN, DR. RICHARD (Göttingen, Germany). Horizontalvariometer (Horizontal Variometer). German Patent 530166, issued July 22, 1931.

Relates to horizontal variometer, characterized by connection of a magnetic needle, suspended on torsion filament, with an optical arrangement for reading position of two needle points in same range of vision, to obtain a simultaneous determination of rotation of magnetic needle around its vertical axis and of lateral displacement of needle caused by inclination of variometer toward vertical line.

Claim allowed - 1.

338. ASKANIA-WERKE AKTIENGESELLSCHAFT (formerly Centralwerkstatt Dessau), AND BAMBERG-FRIEDENAU, CARL (Berlin-Friedenau). Magnetsystem für magnetische Wagen (Magnet System for Magnetic Balances). German Patent 537143, issued Oct. 29, 1931.

Applies to magnet system for magnetic balances, consisting of two magnetic lamellae secured to a central body. This central body is manufactured from a material, preferably iron, thermal coefficient of expansion of which is equal, or almost equal, to that of magnetic lamellae.

Claims allowed - 3.

339. _____ Magnetsystem für magnetische Wagen (Magnet System for Magnetic Balances). German Patent 545131, issued Feb. 25, 1932.

Addition to patent 537143. Relates to magnet system for magnetic balances having a hollow central body manufactured from iron or other material, thermal coefficient of expansion of which is equal to that of magnetic lamellae. According to this invention, side faces of central body are provided with openings. Owing to this unlimited contact with external air is established; thus quicker temperature equalization is obtained.

Claims allowed - 2.

340. ASKANIA-WERKE AKTIENGESELLSCHAFT (formerly Centralwerkstatt Dessau), AND BAMBERG-FRIEDENAU, CARL (Berlin-Friedenau). Magnetsystem für magnetische Wagen (Magnet System for Magnetic Balances). German Patent 576814, issued May 1933.

Includes arrangement of knife-edge in which latter is situated between magnet lamellae.

Claim allowed - 1.

341. _____ Physikalisches Instrument, insbesondere magnetische Wage (Physical Instrument, Particularly the Magnetic Balance). German Patent 549890, issued May 3, 1932.

Refers to magnetic balance in which part assigned for visual observation as well as photographic registration is made rotatable around optical axis of observation telescope, thus making it possible to apply this arrangement in registering apparatus having a horizontal as well as a vertical drum axis.

Claims allowed - 3.

342. _____ Transportkasten für magnetische Wagen mit photographischer Registrierung (Transportation Box for Magnetic Balances with Photographic Registration). German Patent 550190, issued May 9, 1932.

Relates to transportation box in which several instruments belonging together, such as a horizontal balance, vertical balance, and photographic device, are arranged and fixed in such a way that they can be used without being rearranged or taken out of box.

Claims allowed - 4.

343. _____ Vorrichtung zur Kompensation des Temperatureinflusses bei magnetischen Wagen (Arrangement for Compensating the Influence of the Temperature upon Magnetic Balances). German Patent 575870, issued May 4, 1933.

Covers arrangement for compensating influence of temperature upon magnetic balances in which materials of knife-edge bearer and of magnetic lamellae have different heat coefficients of expansion. Arrangement consists of one-sided loading of magnetic system by attaching a weight to magnetic lamellae. This one-sided loading of magnetic system is compensated by suitable development of knife-edge bearer or by affixing to it a weight.

Claims allowed - 4.

344. _____ Vorrichtung zur Kompensation des Temperatureinflusses bei magnetischen Wagen (Arrangement for Compensating the Influence of the Temperature upon Magnetic Balances). German Patent 577478, issued May 31, 1933.

Relates to arrangement for compensating influence of temperature upon magnetic balances by means of balance-body affixed to one part of magnetic system and made from material having a different heat coefficient of extension than material of part carrying balance-body. Balance-body is provided with a horizontally movable weight.

Claims allowed - 2.

345. "ERDA" AKTIENGESELLSCHAFT (Göttingen, Germany). Instrument zur Messung sämtlicher Bestimmungsgrössen des erdmagnetischen Feldes (Instrument for Measuring the Values of All Components Necessary for Determining the Earth-Magnetic Field). German Patent 415872, issued July 2, 1925.

Measures values of all components necessary for determining earth-magnetic field; it is characterized by an arrangement in which a magnetic needle, rotatable around a vertical axis, and serving for measuring horizontal intensity and declination, is fixed above or below magnetic vertical-intensity field balance in such a manner that distance between magnetic needle and beam of field balance can be adjusted.

Claims allowed - 2.

346. _____ Verfahren zur anschaulichen Wiedergabe von magnetischen Feldmessungen (Method for Apparant Representation of Magnetic Field Measurements). German Patent 421899, issued Nov. 20, 1925.

Describes method of representing by small sticks relation to each other of vectors of disturbance calculated for each point from measured values; these small sticks, by which established values and directions are represented, are put at those points of map or of plastic model of region under investigation which correspond to points of observation in terrain.

Claim allowed - 1.

347. _____ Vorrichtung zum Schutz der auf torsionbeanspruchten Achsen bei Messinstrumenten, insbesondere für erdmagnetische Beobachtungen gegen schnelle Temperaturschwankungen (Arrangement for Protecting Axles of Measuring Instruments Based on Torsion, Especially Those Used for Earth-Magnetic Observations, Against Quick Changes of Temperature). German Patent 411093, issued Mar. 10, 1925.

Describes influence of quick changes of temperature upon wire or fiber used as a torsion axis by an arrangement in which such axes are surrounded with oil or similar poor heat-conducting liquid.

Claim allowed - 1.

348. "EXPLORATION" BODEN-UNTERSUCHUNGS U. VERWERTUNGS-GESELLSCHAFT m. b. H. (Berlin, Germany). Vorrichtung zur Verkleinerung des Temperatureinflusses bei magnetischen Wagen (Arrangement for Diminishing the Influence of Temperature in Magnetic Balances). German Patent 471228, issued Jan. 30, 1929.

Concerns an arrangement by which the reducing of the magnetic moment in case of the increase of the temperature is compensated in a simple way. This compensation is obtained by the displacement of the center of gravity of the balance beam closer to the point of support of the balance beam.

Claim allowed - 1.

349. HAALCK, DR. HANS (Berlin-Steglitz, Germany). Lokalvariometer für magnetische Kraftfelder (Local Variometers for Magnetic Fields). German Patent 426772, issued Mar. 18, 1926.

Describes two or more coils, of equal area of turn, which are fixed and connected at different places of a common rotation axis in such a way that their areas of turn lie in the same plane and are directed parallel to the rotation axis, and that the alternating currents produced in them during the rotation have opposite directions. The coils are moved by means of a driving device.

Claims allowed - 2.

350. **HAALCK, DR. HANS** (Berlin-Steglitz, Germany). Magnetische Wage (Magnetic Balance). German Patent 441171, issued Feb. 21, 1927.

Concerns magnetic balance by which measurements of vertical intensity as well as of declination can be made with an accuracy equal to that of instruments generally used. Beam of balance described in this patent consists of two or more magnetic systems crossing each other by an angle; oscillation plane of beam is made rotatable so that adjustment of balance beam to zero position is possible.

Claim allowed - 1.

351. **HAUSER & CO., GESELLSCHAFT m. b. H.** (Augsburg, Germany). Arretiervorrichtung fur magnetische Wagen mit dreifacher Auflage des Systems (Locking Device for Magnetic Balances with a Threefold Application of the System). German Patent 572094, issued Mar. 10, 1933.

Relates to locking device for magnetic balances and is characterized by arrangement in which 2 of 3 points of application of locking system are situated in planes perpendicular to knife-edge and third point in a plane parallel to knife-edge.

Claims allowed - 3.

352. _____ Feldwage (Field Balance). German Patent 530595, issued July 31, 1932.

Discloses arrangement for measuring vertical earth-magnetic change of directing force by means of one or several magnetized bodies secured above or below oscillating system; one or several of these magnetized bodies are made rotatable about an axis parallel to axis of oscillation of field magnet.

Claim allowed - 1.

353. _____ Magnetische Wage (Magnetic Balance). German Patent 573573, issued Apr. 3, 1933.

Applies to magnetic balance characterised by such a shape of metallic casing inside which eddy currents are produced, that body of casing surrounds magnetic lamellae at a distance suitable for damping oscillating system.

Claim allowed - 1.

354. _____ Magnetsystem für magnetische Wagen (Magnetic System for Magnetic Balances). German Patent 573474, issued May 24, 1933.

Covers magnetic system for magnetic balances consisting of two magnet-lamellae fastened to a central body, latter being provided with a knife-edge. According to this invention magnet-lamellae are fastened to central body at one point near or at center of gravity of magnet-lamellae.

Claim allowed - 1.

355. **HAUSER & CO., GESELLSCHAFT m. b. H.** (Augsburg, Germany), **AND OSTERMEIER, JOHANNES** (Althegnenberg, Obb.). Verfahren zur Bestimmung der magnetischen Eigenschaften der obersten Erdschichten (Method for Determining the Magnetic Properties of the Uppermost Earth Layers). German Patent 539751, issued Mar. 10, 1932.

Determines magnetic properties of uppermost earth layers in such a manner that for calculations of magnetic permeability and of magnetic susceptibility obtained from data of earth-magnetic field, an artificial mass defect, suitable in form and magnitude, is produced in uppermost earth layer, and course of disturbance of earth-magnetic field is determined, for example, by measuring with magnetic field balance.

Claim allowed - 1.

356. HAUSER & CO., GESELLSCHAFT m. b. H. (Augsburg, Germany), AND OSTERMEIER, JOHANNES (Althegnenberg, Obb.). Vorrichtung zur Beeinflussung der nullage bei magnetischen Vertikalwagen (Arrangement for Control of the Zero Position in the Magnetic Vertical Balance). German Patent 570498, issued Apr. 16, 1932.

This invention relates to an arrangement by which the zero position of magnetic vertical balances can be controlled. The arrangement consists of a rotatory deflecting system secured above or below the axis of rotation of the oscillating field-balance system. The deflecting system rotates around an axis parallel to the magnetic axis of the oscillating balance system.

Claim allowed - 1.

357. _____ Vorrichtung zur Temperaturkompensation an Magnetsystemen für magnetische Wagen (Device for Temperature Compensation of Magnetic Systems Used in Magnetic Balances). German Patent 573236, issued May 24, 1933.

The device for temperature compensation of magnetic systems used in magnetic balances with lamellae-shaped magnetic bodies, to which this invention relates, is characterized by the fastening of the elongated lamella-shaped bodies, the coefficient of extension of which is different from that of the magnetic body, to the magnet-lamellae in such a way that the center of gravity of the compensation bodies is situated entirely, or almost entirely, on the rotation axis, or above or below the center of gravity on a line perpendicular to this axis.

Claims allowed - 2.

358. _____ (Mering, Germany). Ablesevorrichtung für mit Spiegel versehene Systeme, vorzugweise von magnetischen Wagen (Reading Device for Systems Provided with Mirror, Especially Those Used in Magnetic Balances). German Patent 573235, issued Mar. 30, 1933.

Applies to systems of reading devices, especially those used in magnetic balances, which are provided with mirrors, are swinging about a horizontal axis, and consist of two optical systems. One has objective scale, and other represents real image of objective scale after its reflection from mirror surface of swinging system. Systems are characterized by arrangement in which optical axes of two optical systems form an angle with each other.

Claim allowed - 1.

359. HAUSER AND CO., (G. m. b. H. of Augsburg). Magnetsystem für magnetische Waagen (Magnetsystem for Magnetic Balances). German Patent 609502, issued Apr. 4, 1935.

This invention relates to the knife-edge which is manufactured from the same material as the magnet body or the part connecting the two lamellas; or the knife-edge is manufactured from a material having the same thermal coefficient of expansion.

Claims allowed - 2.

360. QUIRING, DR. ING. HEINRICH (Falkensee b. Spandau, Germany). Verfahren zur Feststellung geringer Lagerveränderungen von Körpern in Bereich von Kraftfeldern (Method for Determining Small Changes of Position of Bodies Within the Range of Fields of Force). German Patent 437365, issued Nov. 16, 1926.

Concerns method for determining small changes of positions of bodies, for example of a plumb line, within fields of force. It is characterized by following: To determine electrical, magnetic, or any other physical potential variation, or variation of oscillation caused by change of position of body, circuit which serves for measuring change of capacity, or of oscillation, is closed only for a short period by utilizing inertia of measuring device and after this device is adjusted to new position of equilibrium.

Claim allowed - 1.

361. RUHSTRAT, ERNEST (Göttingen, Germany). Magnetisches Instrument (Magnetic Instrument). German Patent 440899, issued Feb. 17, 1927.

Applies to magnetic instrument, with two magnetic needles oscillating horizontally, for measuring horizontal intensity, in which two directing magnets are secured, one above upper needle and other below lower needle; force of these magnets is calculated so that one needle is kept in a direction opposite to earth's field and other in direction of earth's field; two needles are thus each in a weak field, of almost equal force but opposite direction, which is composed from earth's field and directing field.

Claim allowed - 1.

362. _____ Magnetisches Messinstrument (Magnetic Measuring Instrument). German Patent 455438, issued Apr. 5, 1928.

Addition to original patent 440899. Differs in that instead of two directing magnets only one is used. Directing magnet may be replaced by a coil through which a circuit produced by adjustable direct current of fixed direction and strength passes.

Claim allowed - 1.

363. _____ Variometer für horizontal und vertikal Intensität (Variometer for Horizontal and Vertical Intensity). German Patent 455437, issued Feb. 1, 1928.

Concerns development of horizontal variometer with two magnetic needles. By this development measurement of vertical intensity is made possible also. Operating apparatus is simplified besides.

Claims allowed - 2.

364. TÖPFER, OTTO, & SOHN (Potsdam, Germany). Erdmagnetisches Vertikal-Intensitäts-Variometer (Earth-Magnetic Vertical-Intensity Variometer German Patent 152489, issued June 21, 1904.

Involves vertical-intensity variometer in which magnet system which is placed in inclination line, is brought to a certain (for example, normal) position by torsion of one or several horizontal filaments or wires.

Claim allowed - 1.

3. Seismic Methods

365. AMBRONN, DR. RICHARD (Göttingen, Germany). Erschütterungsmesser oder Seismograph (Apparatus for Measuring Oscillation, or Seismograph). German Patent 423972, issued Mar. 1, 1926.

Produces elasticity of apparatus, usually obtained by mechanical means (springs) or gravitation (pendulums), mostly by electromagnetic effects, making apparatus simpler. In addition, utilization of energy necessary for registration is especially favorable as friction forces are eliminated.

Claims allowed - 5.

366. _____ Erschütterungsmesser oder Seismograph (Apparatus for Measuring Oscillation or Seismograph). German Patent 423973, issued Jan. 14, 1928.

Addition to original patent 423972. Increases electromagnetic effect by adding an iron body (a tube or a similar body) which also lies in field of magnetizing coil and toward which magnetic or magnetizable mass of oscillator is moved.

Claims allowed - 5.

367. _____ Vorrichtung zur Messung der Grösse und der Genauen Eintrittszeiten sehr Kleiner Beshleunigungsschwingungen. (Device for measuring the value and the exact time of the beginning of very small acceleration oscillations). German Patent 468978, issued Jan. 23, 1930.

This invention relates to a device for measuring the value and the exact time of the beginning of very small acceleration-oscillations. The additional forces produced by these accelerations upon a given mass can be determined by the new device.

Claims allowed - 6.

368. _____ Verfahren zur Erderforschung mittels periodischer elastischer Wellen (Method of Prospecting by Means of Periodic Elastic Waves). German Patent 495750, issued Apr. 24, 1930.

Covers method of prospecting by means of periodic elastic waves in which periodic waves of various continuously or discontinuously changed frequency and form of oscillation,and sometimes of energy, are propagated from a sending station. Their influence is observed and analyzed through resonance of oscillating underground masses dependent on frequency and original form of oscillation of waves at suitably distributed stations provided with seismographs.

Claims allowed - 3.

369. _____ Verfahren zur seismischen Bodenforschung (Seismic Method of Exploration). German Patent 521573, issued Mar. 24, 1931.

Applies to method of seismic exploration by means of elastic waves artificially produced by explosive charges. Charges, which are ignited simultaneously, are arranged in one plane in squares and in such a way that preferable direction of effect is obtained. Receiving instruments are placed within cone of waves.

Claims allowed - 5.

370. AMBRONN, DR. RICHARD (Göttingen, Germany). Verfahren und Vorrichtung zur Ermittlung der Fortpflanzungsgeschwindigkeit von Erschütterungswellen im Erdboden (Method and Device for Determining the Velocity of Propagation of Oscillation Waves Inside of the Ground). German Patent 514538, issued Dec. 29, 1930.

This invention concerns a method for determining the velocity of propagation of oscillation-waves inside of the ground as produced by an explosive charge buried in the ground and registering the moment of the explosion at a distant station by electrical means. According to this invention a device for closing the circuit (for example, a low-tension detonator fuse) is inserted into the main connection of the current for firing the charge. Owing to this device the current connected to the primary winding of a transformer is closed at the moment of the explosion of the charge thus exciting the secondary winding of the transformer. The moment of explosion is registered at the station of observation by means of a secondary current impulse.

Claims allowed - 4.

371. _____ Verfahren zur seismischen Bodenforschung (Seismic Method of Exploration). German Patent 495577, issued Apr. 9, 1929.

Is based on registration at receiving stations of elapsed time of acceleration values and not on registration of motion curve or velocity curve.

Claims allowed - 5.

372. ASKANIA-WERKE AKTIENGESELLSCHAFT (formerly Centralwerkstatt-Dessau) AND BAMBERG-FRIEDENAU, CARL (Berlin-Friedenau, Germany). Erschütterungsmesser (Apparatus for Measuring Vibrations). German Patent 549766, issued Apr. 30, 1932.

Refers to an apparatus for measuring vibrations which is provided with several, preferably three, vibration systems, capable of measuring single components of the vibration independently from each other.

Claims allowed - 6.

373. _____ Geophysikalisches Instrument, insbesondere Seismograph, zum aufzeichnen geophysikalischer Vorgänge unter der Erdoberfläche oder unter Wasser (Geophysical Instrument, Particularly a Seismograph, for Registering Geophysical Proceedings under the Surface of the Earth and Under Water). German Patent 496668, issued Apr. 28, 1930.

Describes seismograph provided with arrangements making it possible to obtain observations when it is buried in ground or sunk in water. Before putting instrument in ground or water or taking it out, it can be locked so that there is no danger of damaging it. Remote action release of locking device is performed by electricity, hydraulic or pneumatic pressure, or some other means.

Claims allowed - 5.

374. AMBRONN, DR. RICHARD (Göttingen, Germany). (assignees) (Ebert, Dr. A., Berlin, and Stern, Ernest, Berlin-Johannisthal, inventors). Verfahren zur Fernübertragung der Sprenzeitpunkte von in der Erde vergrabenen Sprengladungen, insbesondere zur Ermittlung der Fortpflanzungsgeschwindigkeit von Erschütterungswellen im Erdboden (Method for Transmitting to a Distance the Moments of Explosions Caused by Explosive Charges Burded in the Ground, Especially for Determining the Velocity of Propagation of Oscillation Waves Inside the Ground). German Patent 512334, issued Nov. 17, 1930.

Describes method for transmitting moments of explosiosn, especially for determining propagation of oscillation waves inside of ground in which records are obtained by means of light rays projected on a movable sensitive paper. According to this invention, current by which oscillation of oscillating system is produced is rectified by means of a rectifying connection of well-known construction.

Claim allowed - 1.

375. _____ Vorrichtung zur Anzeige von mechanischen, insbesondere seismischen Schwingunsvorgängen unter Wasser (Arrangement for Indicating Mechanical, Especially Seismic, Oscillations under Water). German Patent 556194, issued Aug. 4, 1932.

Is characterized by an arrangement in which, opposite to membrane recording and transmitting oscillations, a second membrane is inserted in such a manner that water pressure, which differs at various depths, affects two membranes with same force; thus no change in adjustment of instrument in its position of rest results.

Claims allowed - 3.

376. ASKANIA-WERKE AKTIENGESELLSCHAFT (formerly Centralwerkstatt Dessau) AND BAMBERG-FRIEDENAU, CARL (Berlin-Friedenau, Germany). Seismograph oder Erschütterungs-messer (Seismograph or Apparatus for Measuring Vibrations). German Patent 598786, issued June 18, 1934.

This invention relates to a seismograph provided with an auxiliary device for determining the natural behavior (Eigenverhalten) of the seismograph, especially its natural vibration, damping, etc. The oscillations excited in the seismograph by the auxiliary device are recorded simultaneously with those produced by the shock. The device is set in the pendulum weight.

Claims allowed - 9.

377. "ERDA" AKTIENGESELLSCHAFT AND MAINKA, DR. CARL (Göttingen, Germany). Erschütterungsmesser (Apparatus for Measuring Oscillations). German Patent 373025, issued Apr. 6, 1923.

Concerns apparatus for measuring oscillations, provided with three pendulum and recording devices. The pendulums consist of pendulum bars and pendulum weights and are suspended from wires tightened horizontally between supporting posts. The devices assigned for registering oscillations in three dimensions (width, depth, and height) are similar. Each device is, besides, provided with a pencil for registering on smoked paper, as well as with mirrors for registering deviation of a light ray upon sensitive paper.

Claims allowed - 2.

378. FRICKE, WILHELM (Halberstadt, Germany). Gerät mit Magnetnadel für Erdbebenwarten und Wetterdienst (Apparatus with Magnetic Needle for Seismic Observations and Weather Stations). German Patent 365556, issued Dec. 18, 1922.

Applies to apparatus by swinging movements of which electric contacts are obtained. These contacts result on one hand in a bell ringing, and on other hand in registration of oscillations of magnetic needle on a drum. Registration of magnetic needle deviation produces, first, a "small alarm" and later a "big alarm."

Claims allowed - 2.

379. _____ Gerät mit Megnetnadel für Erdbebenwarten und Wetterdienst (Apparatus with Magnetic Needle for Seismic Observations and Weather Stations). German Patent 365557 (addition to patent 365556), issued Dec. 18, 1922.

Improvement and further development of patent 365556. Prevents interruption in ringing of bell.

Claim allowed - 1.

380. MINTROP, DR. LUDGER (Bochum, Germany). Erschütterungsmesser (Apparatus for Measuring Vibrations). German Patent 303344, issued June 18, 1920.

Concerns a pendulum meant for measuring or observing artificial vibrations. Consists of arrangement by which oscillations of pendulum are transferred to a mirror or a surface bearing a mirror; latter is provided with a small iron pin, influenced by field of a magnet, by which mirror is constantly brought back to its original position during oscillation.

Claim allowed - 1.

381. _____ Erschütterungsmesser (Apparatus for Measuring Vibrations). German Patent 303345 (addition to patent 303344), issued Juhe 18, 1920.

Addition to patent 303344. Develops bearer of mirror into a magnet and friction piston is made of iron; thus an attraction between them is obtained.

Claim allowed - 1.

382. PIEPMEYER, W., & CO. KOMMANDITGESELLSCHAFT (Kassel-Wilhelmshöhe). Verfahren zur Ermittlung von Lage und Gestalt von nutzbaren Lagerstätten oder Gesteinschichten mittels Beobachtung von Schallwellen (Method for Determining the Position and Shape of Deposits or Rock Layers by Observation of Sound Waves). German Patent 479724, issued July 22, 1929.

Describes method for determining position and shape of deposits or rock layers by observing sound waves propagated inside earth crust. Method is based on change in intensity of sound waves produced artificially at certain intervals. Unlimited number of time marks necessary for observation can be produced.

Claim allowed - 1.

383. REEH, REINHARD (Koblenz-Neuendorf). Gerät zur Beobachtung von Erschütterungswellen (Apparatus for Observing Oscillation Waves). German Patent 398311, issued July 7, 1924.

Includes arrangement in which fixed mirror is replaced by reflecting surface of a liquid, as well as by arrangement of transmission by which oscillations produce movement of liquid.

Claims allowed - 6.

384. REEH, REINHARD (Koblenz-Neuendorf). Gerät zum Beobachtung von Erschütterungswellen (Apparatus for Observing Oscillation Waves). German Patent 399179 (addition to Patent 398311), issued July 21, 1924.

Improvement on original patent 398311. Consists mainly in the following: Movable parts of seismic pendulum connected with oscillating bodies, and steady mass of pendulum supported by an elastic body, enclose a hollow space, capacity of which changes, corresponding to shocks produced by oscillations.

Claims allowed - 8.

4. Electrical Methods

385. AMBRONN, DR. RICHARD (Göttingen, Germany). Verfahren zum Aufsuchen wertvoller Bodeneinlagerungen auf elektromagnetischen Wege durch Zuführung elektrischer Wechselströme (Method for Discovering Valuable Deposits Electromagnetically by Introducing into the Ground Electrical Alternating Currents). German Patent 464767, issued Dec. 4, 1928.

Covers method for locating valuable deposits electromagnetically by introducing alternating current into ground and investigating corresponding components produced of magnetic field vector with regard to their mutual relation, as well as their relation to normal phase.

Claims allowed - 7.

386. _____ Verfahren zur Bodenforschung auf elektromagnetischen Wege durch Erregung elektrischer Wechselströme im Untergrunde und Aufnahme der elliptischen Schwingungen des Bodenstromes bzw. des magnetischen Vektors (Method for Electromagnetic Investigation of the Ground by Alternating Current Produced under the Ground and Determination of the Elliptical Oscillation of the Earth Current or of the Magnetic Vector). German Patent 469445, issued Dec. 17, 1928.

Is characterized by following proceeding: In all points of observation of whole region under investigation or of single parts of it those diameters of ellipses of oscillation are determined for which field vectors taken in their direction are of same phase.

Claims allowed - 6.

387. _____ Verfahren zur elektrischen Bodenforschung (Method for Electrical Investigation of the Ground). German Patent 498912, issued May 28, 1930.

Applies to method for electrical investigation of ground in which alternating currents of very low frequency (0.3 - 10 per second) are employed and intensity distribution of which in current field is measured either directly or by compensation. Measuring instrument used is a galvanometer tuned to frequency of sender.

Claims allowed - 3.

388. AMBRONN, DR. RICHARD (Göttingen, Germany). Verfahren zur elektrischen Bodenforschung durch vollständige Ausmessung der elektrischen und magnetischen Elemente des durch den untergrund-zugeführten Wechselströme erzeugten, elliptisch polarisierten elektromagnetischen Feldes (Method for Electrical Investigations of the Ground by Complete Measurement of Electric and Magnetic Elements of an Elliptically Polarized Electromagnetic Field Produced by Alternating Currents Conducted Through the Subsoil). German Patent 471636, issued Feb. 25, 1929.

Covers arrangement by which disturbing effects of vagabond currents are nullified by grounding that point (neutral point) of measuring apparatus with regard to which disturbances compensate each other.

Claims allowed - 5.

389. _____ Verfahren zur elektrischen Bodenerforschung mittels dem Untergrund induktiv-zugeführter Wechselströme und Ausmessung des elliptisch polarisierten magnetischen Feldes durch Suchspulen (Method for Electrical Investigation of the Ground by Means of Alternating Currents Produced in the Subsoil by Induction and Measurement of an Elliptically Polarized Magnetic Field by Means of Searching Coils). German Patent 494331, issued Mar. 27, 1930.

Concerns improvements in method for electrical investigation of ground, described in original patent 454767, which consist in determining field component produced by magnetic whirl as conjugated diameter to that diameter of ellipse of oscillation of magnetic vector which corresponds to magnetic field component produced directly by alternating current at point of observation. Measurements are repeated at several frequencies of alternating current, chosen so that results obtained can be extrapolated to zero frequency.

Claims allowed - 2.

390. _____ Vorrichtung zur Ausmessung der magnetischen Kraftlinien eines elektromagnetischen Wechselfeldes, vorzugsweise zu Erderforschungszwecken (Apparatus for Measuring Magnetic Lines of Force of an Electromagnetic Alternating Field, Especially for the Purpose of Ground Investigation). German Patent 448190, issued Aug. 6, 1927.

Concerns apparatus for measuring magnetic lines of force of electromagnetic alternating field characterized by following arrangement: Position of plane of turn of induction coil in space is indicated by pendulum body provided with vertical galvanoscope; this pendulum is suspended so that it can be moved freely around two axes perpendicular to each other and situated in same plane; one of these axes is perpendicular to plane of turn of induction coil.

Claim allowed - 1.

391. ASKANIA-WERKE AKTIENGESELLSCHAFT (formerly Centralwerkstatt Dessau) AND BAMBERG-FRIEDENAU, CARL (Berlin-Friedenau, Germany). Stromrichtungsanzeiger (Polarity Indicator). German Patent 530673, issued July 31, 1931.

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Relates to polarity indicator and is characterized by following arrangement: Device is provided with a floating body within which is another body secured to it by means of a Cardan suspension. Two bodies are adjusting themselves, the first in direction of current and the second in vertical direction. Outer Cardan ring, which is firmaly secured to floating body, has a graduation arc, and body provided with Cardan suspension an adjustable index (or vice versa). Mutual position of these two parts indicates inclination of floating body toward the body with Cardan suspension, thus also direction of current in a vertical plane.

Claims allowed - 5.

392. BASSET, JAMES (Paris, France). Verfahren zur Ermittlung von elektrisch gut leitenden, in eine Flüssigkeit versenkten Massen durch Feststellung der Widerstandsänderung der Flüssigkeitsstrecke zwischen eingetauchten stromführenden Elektroden (Method for Detecting Bodies of Good Electric Conductivity Sunk into a Liquid by Determining the Variation of the Electric Resistance of the Section of the Liquid between the Immersed Electrodes Carrying Current). German Patent 534562, issued Oct. 1, 1931.

Covers method for detecting bodies of good electric conductivity sunk into a liquid; method is characterized by following arrangement: Electrodes are so connected to a cable provided with a plurality of conductors that each conductor is divided into two sections, each of latter being connected to one of electrodes; ends of sections are provided with synchronously rotating switches.

Claims allowed - 2.

393. CHAPMAN, ERNEST HALL (Brooklyn, N.Y.), AND BEDFORD, THOMAS (Stancliffe Hall, Derbyshire, England). Mit metallischer Schutzhülle versehene Rahmenantenne zur Aufnahme eines mit konstanter Stärke-übertragenen Hochfrequenz-Signals bei elektromagnetischen Schürfverfahren (Frame Antenna for Receiving High-Frequency Signals of Constant Intensity, Uses in Electromagnetic Methods of Prospecting, Provided with Protecting Metallic Cover). German Patent 564143, issued Nov. 14, 1932.

Uses frame antenna for receiving high-frequency signals of donstant intensity. Antenna is provided with protecting metallic cover which, in the case of known wave lengths, serves for adjustment to most favorable damping of antenna by bending protecting cover at fixed places toward winding of antenna.

Claim allowed - 1.

394. DIECKMANN, DR. MAX (Gräfeling, near Munich, Germany). Verfahren zur Auffindung unterirdischer oder verdeckt verlegter metallischer Kabel oder Rohrstränge mit Hilfe schneller elektrischer Schwingungen (Method for Discovering Metallic Cables or Pipe Lines Buried in the Ground or Placed Under Shelter, by Means of Rapid Electrical Oscillations). German Patent 303912, issued Sept. 29, 1919.

Is characterized by transmission, from generating system to conductor sought for, of high-frequency energy by means of coupling so that high-frequency field produced around conductor can be determined by means of indicator of which sensitivity of oscillations is either adjusted or not adjusted.

Claim allowed - 1.

395. ELECTRICAL ORE FINDING CO., LTD. (London). Verfahren zur Auffindung und Bestimmung von Erzlagern (Method for Discovering and Determining Ore Deposits). German Patent 152519, issued July 5, 1904.

Relates to method for discovering ore and other mineral deposits, characterized by possibility of determining property and position of deposit by means of sound produced in a telephone receiver inserted between two portable electrodes and by which a contact with surface of earth is established, while variable electric current impulses are sent through ground from induction coil by means of another pair of portable electrodes.

Whole arrangement consists of (1) an induction coil, (2) a telephone-receiver, and (3) four electrodes for establishment of earth connections.

Claim allowed - 1.

396. "ERDA" AKTIENGESELLSCHAFT (Göttingen, Germany). Einrichtung zur Aufsuchung und Begrenzung elektrisch leitender Räumen von abweichender Leitfähigkeit oder Dielektrizitätskonstante (Method for Detecting and Delimiting Electrically Conductive Spaces Surrounded by Spaces with Anomalous Conductivity or Dielectric Constant). German Patent 405473, issued Nov. 1, 1924.

Covers method by which electrically conductive spaces surrounded by spaces with anomalous conductivity or dielectric constant are detected and their borders established by determining direction and intensity of electrical waves emitted from a fixed place and deflected from surface, limiting conductive space and running along suitably situated lines around surface sought for.

Claim allowed - 1.

397. _____ Unpolarisierbare Elektrode zu Erdforschungszwecken (Nonpolarizable Electrodes for Ground Investigation). German Patent 367634, issued Jan. 24, 1923.

Describes nonpolarizable electrode used for ground investigation, in which metal electrode which serves as a means for passing current is surrounded by a series of solutions of similar or different metallic salts separated from each other by porous walls and having a concentration which approaches by steps electrolytic concentration of ground.

Claim allowed - 1.

398. _____ Verfahren zur Aufsuchung von Körpern im Untergrunde (Method for Discovering Bodies Lying Underground). German Patent 392158, issued Mar. 17, 1924.

Discloses method for discovering bodies lying under ground, electrical conductivity of which differs from that of material surrounding them, by means of electrical current-line method, equipotential-line method, or similar methods if there is in ground another known disturbing deposit conductivity of which also differs from material surrounding it. Method is characterized by screening off known deposit from field to be investigated by means of one or a series of auxiliary electrodes connected to one or both field electrodes.

Claims allowed - 2.

399. "ERDA" AKTIENGESELLSCHAFT (Göttingen, Germany). Verfahren zur Ausmessung magnetischer Wechselfelder (Method for Measuring Magnetic Alternating Fields). German Patent 400148, issued Aug. 7, 1924.

Describes method for measuring magnetic alternating fields, especially for ground investigation, in which revolving axis of a coil turned around slowly is adjusted so that variations of alternating current induced in coil by earth currents, which vary in field of lines of force during rotation, disappear.

Claims allowed - 4.

400. _____ Verfahren zur elektrischen Untersuchung des Untergrundes (Method for Electrical Investigation of the Subsoil). German Patent 422348, issued Nov. 28, 1925.

High-frequency alternating currents are passed into ground at two or more suitable selected points and intensity, direction, and polarization conditions of these alternating currents, at points suitably distributed, are determined by inclosing in electromagnetic alternating field produced by current-receiving systems for high-frequency oscillations.

Claims allowed - 2.

401. _____ Verfahren zur Ergänzung von Messungen mittels Equipotentiallinien-Methode für Erderforschungszwecke (Method for Supplementing the Measurements Made by Means of Equipotential Line Method for Earth Investigation). German Patent 392189, issued Mar. 17, 1924.

Is characterized by an arrangement in which, at places of measured potential lines distributed suitably, voltage drop perpendicular to potential line is measured quantitatively or relatively and local current density of ground is determined in connection with resistance measurements in closing circuit of the probe current.

Claim allowed - 1.

402. _____ Verfahren zur Richtungsbestimmung von elektromagnetischen Strahlungen, vorzugsweise in Bergwerken (Method for Determining the Direction of the Electromagnetic Radiation, Especially in Mines). German Patent 404098, issued Oct. 11, 1924.

Determines, by means of a frame antenna, direction of magnetic lines of force produced by two transmitting antennae, located at same place or at two places close to each other, magnetic axes of which are perpendicular to each other and also perpendicular to direction toward receiving station.

Claims allowed - 3.

403. _____ Verfahren zur Untersuchung der Bodenbeschaffenheit auf Grund der Verteilung der elektrischen Leitfähigkeit im Boden (Method for Investigating the Nature of the Ground, Based on the Distribution of Electrical Conductivity in the Soil). German Patent 406299, issued Nov. 17, 1924.

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Measures and compares variations of natural magnetic earth field produced by natural earth currents, as well as artificial current impulses. Measurements are made at several points, suitably distributed, by means of a magnetometer or adjusted resonance systems.

Claims allowed - 3.

404. "ERDA" AKTIENGESELLSCHAFT (Göttingen, Germany). Vorrichtung zum Aufsuchen von magnetischen oder elektrisch leitfähigen Stoffen (Method for Discovering Magnetic or Electrically Conductive Materials). German Patent 392987, issued Mar. 28, 1924.

Describes arrangement for discovering magnetic or electrically conductive materials, based on their influence upon development of lines of force in a magnetic direct-current field or alternating-current field or upon induction coefficients of coils. Method is characterized by arrangement in which two electromagnetic systems of different geometrical shape are in differential connection to each other; these systems are influenced differently by distribution of magnetically or electrically conductive masses in space.

Claims allowed - 3.

405. _____ Vorrichtung zur Bestimmung von Richtung, Intensität, und Polarisationszustand elektrischer Wellen, insbesondere zu Erderforscherungszwecken in Bergwerken (Method for Determining the Direction, Intensity, and Polarization State of Electrical Waves, Especially for Purposes of Investigation of the Ground in Mines). German Patent 378224, issued Nov. 16, 1923.

Describes arrangement in which receiving system consists of a frame antenna rotatable about a horizontal and a vertical axis connected with a rotatable or oscillating condenser.

Claims allowed - 4.

406. "ERDA" AKTIENGESELLSCHAFT AND AMBRONN, DR. RICHARD (Göttingen, Germany). Schaltungsanordnung für Erderforschung (Electrical Circuit Arrangement for Earth Investigation). German Patent 403213, issued Oct. 12, 1924.

Produces, on an area outside of region to be investigated, a tension field of a form similar to that of field. Spatial or superficial distribution of tension with regard to this field is then measured directly or with aid of a potentiometer inserted in this tension field.

Claims allowed - 2.

407. _____ Vorrichtung zur Aufsuchung und Lagerbestimmung von Massen abweichender elektrischer Leitfähigkeit im Erdboden (Arrangement for Discovering and Determining the Position of Subterranean Masses Having Anomalous Electrical Conductivity). German Patent 372536, issued Mar. 29, 1923.

Establishes distribution of electrical potential or equipotential lines along surface of earth or along boreholes by means of flat electrodes disposed on surface of earth or lowered into ground in places suitably situated with respect to object sought for.

Claim allowed - 1.

408. ERFORSCHUNG DES ERDINNERN GESELLSCHAFT M. B. H., HANOVER (Geschäftstelle Göttingen, Göttingen, Germany). Verfahren zur Erforschung von Gesteinschichten durch elektrische Messungen (Method for Exploration of Rock Layers by Means of Electrical Measurements). German Patent 287611, issued Sept. 25, 1915.

Determines resistance of rock layers with aid of electrodes, buried in rock, applying alternating current of suitable frequency.

Claim allowed - 1.

409. _____ Verfahren zur Feststellung des Verlaufs von Erdbohrungen (Method for Determining the Course of Boreholes). German Patent 287610, issued Sept. 28, 1915.

Connects metallic parts which may be found in boreholes, especially metallic tubing of, for example, two adjacent boreholes, to alternating-current generator, so that they form coating of a condenser, dielectric of which represents intermediate ground. By measuring and determining capacity, resistance, and self-induction distance between coatings of condensers, that is, distance between two boreholes, is determined.

Claim allowed - 1.

410. "EXPLORATION" BODEN-UNTERSUCHUNGS- UND VERWERTUNGS GESELLSCHAFT M. B. H. (Berlin, Germany). Verfahren zur praktisch vollständigen Eliminierung des Einflusses der Induktion der Zuleitungen zu den Elektroden auf das Aufnahmegerät eines zum Zwecke der Bodenerforchung in den Untergrund gesandten Wechselstroms (Method for Practically Complete Elimination of the Influence of the Induction of the Wire Connected to Electrodes upon the Receiving Apparatus of an Alternating Current Introduced into the Subsoil for the Purpose of Investigating the Ground). German Patent 469018, issued Nov. 29, 1928.

Uses double-wound wires. First electrode is connected with generator directly; wire leading to second electrode is branched, at a point close to first electrode, into two lines of equal resistance; these two lines are conducted around region to be investigated in a symmetrical form (for example, in form of a rectangle). By this arrangement, influence of induction produced by single parts of line upon receiving apparatus is virtually eliminated.

Claims allowed - 2.

411. GEFFCKEN, DR. RUDOLPH HERMANN, AND RICHTER, DR. RUDOLF HANS (Leipzig-Gohlis, Germany). Einrichtung zum Nachweis von leitenden Körpern (Arrangement for Determining Conductive Bodies). German Patent 426795, issued Mar. 17, 1926.

Determines conductive bodies by means of several loosely coupled systems, capable of oscillating and so adjusted to exciting frequency that oscillation produced in each system remains, with regard to inducing oscillation, in region of sharp phase change; arrangement for determining shifts of phase conditions of the systems is added.

Claims allowed - 3.

412. GEFFCKEN, DR. RUDOLPH HERMANN, AND RICHTER, DR. RUDOLF HANS (Leipzig-Gohlis, Germany). Einrichtung zum Nachweis von leitenden oder magnetischen Körpern (Arrangement for Determining Conductive or Magnetic Bodies). German Patent 417834, issued Sept. 19, 1925.

Locates conductive or magnetic bodies, according to their influence upon vibration conditions of a tubular generator, by determining changes of anode direct-current or grid direct-current of generator tubes caused by this influence.

Claims allowed - 5.

413. _____ Einrichtung zum Nachweis von leitenden oder magnetisierbaren Körpern (Arrangement for Determining Conductive or Magnetizable Bodies). German Patent 404099, issued Oct. 13, 1924.

Determines conduction or magnetizable bodies by means of frequency changes made perceivable in form of changes of sound-frequency oscillations. Arrangement is characterized by determining frequency changes of sound-frequency oscillations by working with other oscillations or other systems of oscillations.

Claims allowed - 6.

414. _____ Einrichtung zum Nachweis von leitenden oder magnetisierbaren Körpern durch Frequenzänderung von Schwingungen (Arrangement for Determining Conductive or Magnetizable Bodies by Change of Frequency of Oscillations). German Patent 435255, issued Oct. 11, 1926.

Couples at least two oscillation systems with each other and so adjusted that in case of changes of natural frequency of one system, stronger changes of coupled frequencies or of frequency of one of really existing oscillations appear. It is essential that more than one of coupled oscillation systems be provided with a generator.

Claims allowed - 5.

415. GELLA, NORBERT (Vienna, Austria). Verfahren zur elektrodynamischen Erforschung des Erdinnerns mittels die erdschichten Durchstrahlender, von Telephonempfängern aufzufangender elektrischer Induktionsströme (Method for Electrodynamic Investigation of the Subsoil by Means of Electrical Induction Currents Penetrating through the Earth Layers and Caught by Telephone Receivers). German Patent 403494, issued Oct. 2, 1924.

Leaves receiving station at same place and moves transmitter along borders of region under investigation, determining strength of sound by means of a telephone.

Claims allowed - 2.

416. GESELLSCHAFT FÜR DRAHTLOSE TELEGRAPHIE M. B. H. (Berlin). Einrichtung zur Auffindung unterirdischer oder verdeckt Liegender, gutleitender Gegenstände (Method for Finding Subterranean or Sheltered Objects of Good Conductivity). German Patent 305574, issued Sept. 9, 1919.

Includes oscillating system with cathodic generator, induction coil with strong leakage field connected to it, and arrangement for noticing frequency changes of resonance current caused when induction coil is brought into proximity with conducting body. Another feature of invention is device for producing auxiliary oscillations which, combined with original oscillations, results in interference sound, so that frequency change can be perceived either as a sound or as a change of sound.

Claims allowed - 2.

417. GESELLSCHAFT FÜR DRAHTLOSE TELEGRAPHIE M. B. H. (Berlin) Verfahren zur Feststellung der Lage elektrisch leitender Flächen in der Erde mit Hilfe der Reflexion elektrischer Wellen (Method for Determining the Position of Subterranean Electrically Conductive Areas with the Aid of the Reflection of Electrical Waves). German Patent 377187, issued June 13, 1923.

Describes method in which sender consists of horizontal antenna and receiver of frame antenna rotatable about horizontal axis; by latter antenna angle of incidence of reflected waves emitted from conducting area, and therefere also position of this area, are determined.

Claim allowed - 1.

418. GESELLSCHAFT FÜR PRAKTISCHE GEOPHYSIK M. B. H. (Freiburg, Breisgau, Germany). Anordnung zur Bestimmung der Richtung eines in der Erde fliessenden Wechsel-oder Gleichstromes (Arrangement for Determining the Direction of an Alternating or Direct Current Flowing Inside the Earth). German Patent 393644, issued Apr. 11, 1924.

Connects 3 search electrodes to 3 or 2 coils or current conductors so that angles of coil planes correspond to angles formed by lines connecting 3 search electrodes; effect of one coil corresponds to length of respective path on earth, so that direction of maximum or minimum induction in rotatable coil or deviation of magnet needle shows direction of whole alternating or direct current inside earth.

Claim allowed - 1.

419. _____ Verfahren zum Feststellen von Wasserannäherung bei verrohrten Bohrungen (Method for Determining the Approach of Water in Tubed Boreholes). German Patent 407495, issued Dec. 17, 1924.

Describes method in which metallic tubing of borehole itself forms capacity of resonance current; tubing capacity and its change are measured directly in a known way, either by measuring charge current or discharge current or by using a combination with another resonance current, according to well-known method of electrical vibrations; capacity change of tubing caused by approach of water is determined from change in rate of vibration of sound or from strength of charge and discharge current.

Claims allowed - 2.

420. _____ Verfahren zur Feststellung der Tiefe einer das Stromlinienfeld störenden Einlagerung in der Erde (Method for Determining the Depth of a Subterranean Deposit by Which the Current-Line Field is Disturbed). German Patent 377837, issued June 28, 1923.

Fixes two induction loops or induction coils assigned for determining direction of lines of force of field at different heights from surface of ground and rotated until maximum or minimum induction effect is obtained. To determine intensity difference of field at two positions induction effects obtained in two coils are compared with each other or determined, according to zero method, with aid of a branched part of primary current working in opposite direction.

Claim allowed - 1.

421. HAUSER & CO., GESELLSCHAFT M. B. H. (Augsburg, Germany) AND OSTERMEIER, JOHANN B. (Mering near Augsburg, Germany). Verfahren und Vorrichtung zur Aufsuchung von Erzausbissen oder Erzanreicherungen in flachen Gewässern oder durchfeuchteten Sanden oder Geröllen (Method and Apparatus for Discovering Ore Outcrops and Ore Enrichments Covered by Shallow Waters, Wet Sands, or Boulders). German Patent 577272, issued June 1, 1933.

Relates to method for discovering ore outcrops and ore enrichments covered by shallow waters, wet sands, etc. Potential difference between two metal electrodes of equal electrochemical value can be established by this method. Polarization voltage can be measured as soon as 1 of 2 electrodes touches surface of ore to be discovered.

Claims allowed - 5.

422. HECKMANN, KÄTE (Freiburg, Breisgau, Germany). Anordnung der Elektroden für einem elektrischen Stromverfahren zu Bodenuntersuchungen (Arrangement of Electrodes for an Electrical Current Method for Investigating the Soil). German Patent 435364, issued Oct. 11, 1925.

Recommends placing several primary electrodes along one line equal distances from each other; signs of electric tension given them must alternate; secondary electrodes are distributed on both sides of each primary electrode so that their tension difference is zero.

Claim allowed - 1.

423. HEUER, HERMANN (Gandersheim, Harz, Germany). Verfahren und Vorrichtung zur Bestimmung von Aquipotentialflachen und-Linien (Method and Apparatus for Determining Equipotential Surfaces and Equipotential Lines). German Patent 453564, issued Dec. 14, 1927.

Presents method and apparatus for measuring equipotential surfaces and equipotential lines, by which their determination becomes more accurate, owing to possibility of compensating and measuring undesirable induction currents.

Claims allowed - 5.

424. _____ Verfahren und Vorrichtung zur Messung von Aquipotentialflächen und-Linien (Method and Apparatus for Measuring Equipotential Surfaces and Equipotential Lines). German Patent 458021, issued Mar. 31, 1928.

Addition to patent 453564. Discovers spatial distribution of current by means of two measurement currents, each provided with two probes, branched from the spatial conductor - for example, the ground.

Claims allowed - 7.

425. HEUER, HERMANN (Gandersheim, Harz, Germany) AND OTHERS. Verfahren zur Ausmessung des Feldes eines insbesondere zum Zwecke der Bodenerforschung mit Elektroden in den untergrund-gesandten Wechselstromes (Method of Measuring the Field of an Alternating Current Sent under the Ground by Means of Electrodes, Especially for the Purpose of Ground Investigation). German Patent 470231, issued Jan. 10, 1929.

Addition to patent 453564. Covers simplification of apparatus. Resonance device is placed directly in main line instead of in a special measurement probe line, and changes necessary to compensate disturbances serve directly to locate disturbing local deposits.

Claims allowed - 2.

426. HEUER, HERMANN (Gandersheim, Harz, Germany) AND OTHERS. Verfahren zur Bestimmung von Äquipotentialflächen und-Linien, bei dem Wechselstrom in dem Räumlichen leiter zugeführt und mit Sonden entnommen wird (Method for Determining the Equipotential Lines in Which Alternating Current is Led in the Spatial Conductor and is Taken out with Probes). German Patent 485286, issued Oct. 30, 1929.

Addition to patent 453564. Reduces high resistances by device producing negative resistance and containing vacuum tubes. Intensity of heating current of vacuum tubes indicates value of resistance to be compensated, especially concerning conductivity of geological formations.

Claims allowed - 4.

427. KOENIGSBERGER, DR. JOHANN (Freiburg, Breisgau, Germany). Verfahren zur Aufsuchung von Einlagerungen im Erdboden (Method for Locating Subterranean Deposits). German Patent 444506, issued May 21, 1927.

Locates deposits (iron ore, water, coal) surrounded entirely or partly by substances of lower electrical conductivity or with lower dielectric constant by measuring electrical waves emitted from sending station at various receiving stations at approximately equal distances from sending station. Invention is based on theory that better electrical conductivity and greater dielectric constant of bodies cause a certain concentration of waves along border surfaces of these bodies.

Claim allowed - 1.

428. LEIMBACH, DR. GOTTHELF (Göttingen, Germany). Verfahren zur Aufsuchung leitender Flächen (z. B., Wasser und Erz) mittels elektrischer Wellen (Method for Exploring Conducting Surfaces - for Example, Water and Ore - by Means of Electric Waves). German Patent 273339, issued Apr. 24, 1914.

Determines that length of a wave by which a sender, provided with one or several antennae running approximately parallel to conducting surface, shows minimum damping, in which case one fourth length of wave or an odd multiple of it equals distance of antennae from conducting surface.

Claim allowed - 1.

429. LEIMBACH, DR. GOTTHELF, AND LÖWY, DR. HEINRICH (Göttingen, Germany). Verfahren zur systematischen Erforschung des Erdinnern grösserer Gebiete mittels elektrischer Wellen (Method of Systematic Exploration of the Subsoil over Large Areas by Means of Electrical Waves). German Patent 237944, issued Sept. 14, 1911.

Locates hidden ore deposits by erection on area to be explored (level country, mountains, islands) of antennae by which electrical waves are emitted or received. On a level terrain about 200 meters deep holes are drilled in which antennae wires are inserted. In mountainous regions antennae are erected at foot of mountains. In case of exploration of islands antennae wires are sunk in water from ships.

Claim allowed - 1.

430. LÖWY, DR. HEINRICH (Berlin, Germany). Einrichtung zum elektroaviatischen Nachweis und zur Messung des Abstandes elektrisch leitfähiger Massen (Arrangement for Electroaviatic Investigation and for Measuring Distances from Electrically Conductive Masses). German Patent 425050, Feb. 11, 1926.

Connects two or more airships by metallic wires serving as an antenna.

Claims allowed - 4.

431. _____ (Göttingen, Germany). Verfahren zum Nachweis unterirdischer Erzlager und Grundwasserspiegel mittels elektrischer Wellen (Method for Determining Subterranean Ore Deposits and the Level of Underground Water by Means of Electrical Waves). German Patent 254517, issued Dec. 6, 1912.

Discloses subterranean ore deposits and level of underground water by observation of interference, in a receiving antenna stretched horizontally close above ground, of electrical waves produced in a sending antenna parallel to receiving antenna, waves being received partly directly and partly after reflection from subterranean ore deposit (or from level of ground water).

Claim allowed - 1.

432. _____ Verfahren zur Erforschung von Gesteinsschichten innerhalb von Bergwerken (Method of Exploration of Rock Layers within Mines). German Patent 254478, issued Dec. 6, 1912.

Explores rock layers within mines by producing inside of drifts and boreholes electrical resonance currents and measuring their capacity (frequency) and damping.

Claim allowed - 1.

433. _____ (Vienna, Austria). Einrichtung zum Nachweis elektrisch leitfähiger Schichten des Erdbodens (Arrangement for Determining Electrically Conductive Layers of the Ground). German Patent 432221, issued July 27, 1926.

Determines electrically conductive layers of ground by means of electrical oscillator carried by airship; invention is characterized by arrangement in which metallic frame of airship serves as an antenna.

Claim allowed - 1.

434. _____ Einrichtung zum Nachweis und zur Messung des Abstandes elektrisch leitfähiger Massen (Method for Determining and Measuring the Distance from Electrically Conductive Masses). German Patent 403939, issued Oct. 7, 1924.

Includes method by which transmitter and receiver are switched off in alternation and with variable frequency by means of a modulation transmitter (Modulationssender). Modulation carried out by alternating current, electrical oscillations, direct current with reduced pulsations, or electrical vibrations.

Claims allowed - 3.

435. LÖWY, DR. HEINRICH (Berlin, Germany). Einrichtung zur Messung und zum Nachweis kleiner Änderungen der Frequenz von elektrischen Schwingungskreisen, insbesondere zum Nachweis der durch unterirdische elektrische Leiter verursachten Änderungen der Frequenc von Luftfahrzeug-Antennen (Arrangement for Measuring and Determining Small Frequency Changes in Electric Resonance Currents, Especially for Determining the Frequency Changes in Airship Antennae Caused by Subterranean Electric Conductors). German Patent 436827, issued Nov. 13, 1926.

Covers method by which electrical oscillation system under investigation is so arranged (for example, in case of tubular senders, by means of suitable choice of constants of oscillation current) that oscillation process is displaced to close proximity of a place of rupture or to region of a sharp drop of oscillation amplitude in which great changes of oscillation amplitude correspond to small changes of frequency.

Claim allowed - 1.

436. _____ Verfahren zur elektrischen Erforschung des Erdinnerns (Method of Electrical Investigation of the Interior of the Earth). German Patent 368079, issued Jan. 31, 1923.

Makes large number of measurements in a very short time by flying above ground in an airplane or airship; method is characterized by equipping airship with earth antenna drawn along ground during flight.

Claims allowed - 2.

437. _____ Verfahren zur Erforschung des Erdinnerns mittels eines von einem Luftschiff oder Flugzeug über den Boden geführten offenen oder geschlossenen Schwingungskreiss (Method for Investigating the Subsoil by Means of an Open or Closed Oscillatory Circuit Carried Along above the Ground by an Airship or Airplane). German Patent 401448, issued Sept. 4, 1924.

Relates to method such that oscillatory circuit is not drawn along on ground during flight but is secured at a constant distance below airship or airplane and thus moved above ground.

Claims allowed - 2.

438. LÖWY, DR. HEINRICH, AND LEIMBACH, DR. GOTTHELF (Göttingen, Germany). Verfahren zum Nachweis unterirdischer Erzlager oder von Grundwasser mittels elektrischer Wellen (Method for Determining Subterranean Ore Deposits or Underground Water by Means of Electrical Waves). German Patent 246836, issued May 11, 1912.

Consists of apparatus by which electric waves are emitted from antenna of sending system on surface of ground. After reflection of these waves from subterranean body latter is disclosed by receiving station, also provided with antenna.

Claim allowed - 1.

439. LUNDBERG, HANS TORKEL FREDRIK, AND NATHORST, HARRY JOAHN HJALMAR (Stockholm). Vorrichtung zum Entdecken und Bestimmen der Lage von Erz-oder Mineralgängen auf elektrischem Wege (Method for Discovering and Determining the Position of Ore and Mineral Deposits by Electrical Methods). German Patent 328835, issued Nov. 8, 1920.

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Consists of two pairs of electrodes, one connected with source of current (primary electrodes) and other (secondary electrodes, called searching rods) provided with a sensitive receiver, for example, a telephone; secondary electrodes are brought into connection with ground at different places between primary electrodes. Arrangement of two primary electrodes (or only one of them) is proposed in form of points lying along a straight line or a curve - for example, in form of a bare wire placed on surface of ground. It is very important that extension occupied by electrode (or electrodes) along surface of ground be great compared with distance between electrodes, as only in this case will equipotential lines be straight lines or elongated curves.

Claim allowed - 1.

440. MACHTS, LUDWIG (Marburg, Lahn, Germany). Vorrichtung zum Auffinden von elektrisch Leitenden, dem auch durch nichtleiter verborgener Körpern (Method for Discovering Bodies Conducting Electricity, Hidden from Sight by Nonconductors). German Patent 330090, issued Dec. 7, 1920.

Applies to method by which electric waves reflected by bodies conducting electricity are, after reflection, collected by a receiving apparatus. Method is characterized by arrangement by which reflected waves are united (similar to light waves) by means of a lens into a picture invisible to eye; this picture is received automatically by a spiral antenna; more or less strong induction currents produced in latter are intensified by means of tubular receivers and intensifying lamps - for example, with aid of a discharge line running sychronously to antenna; luminous discharges are projected upon a film and reproduced on it photographically; conclusions on distribution of conducting body can be drawn from differences in intensity of brightness of films.

Claim allowed - 1.

441. MÜLLER, LOUIS (Berlin-Baumschulenweg, Germany). Elektrometer zur Erderforschung durch Vergleichsmessung der elektrischen Leifähigkeit der Luft an mehreren Stellen (Electrometer for Exploration by Means of Comparative Measurements of Electrical Conductivity of the Air at Several Places). German Patent 535556, issued Oct. 13, 1931.

Relates to electrometer for exploration by means of comparative measurements of electrical conductivity of air at several places. Two or more lamellae, one above other, independent of each other, of same magnetization and rotatable around a vertical axis, as well as a corresponding number of immovable walls consisting of isolating material and provided with conducting coating, are so arranged within case that by charging at any potential, lamellae, which originally are close to coating and are adjusted to north-south direction, are deviated from this direction at equal angles. After this connection of conducting coating with collectors installed at various places of region under investigation is established and velocity of the retrograde movements of the different lamellae compared.

Claims allowed - 3.

442. OBERSCHLESISCHE WERKSTÄTTEN FÜR PRAZISIONSMECHANIK GESELLSCHAFT M. B. H. (Ratibor, Upper Silesia, Germany). Kammsonde für die Zwecke der elektrischen Bodenerforchung (Probe Comb for the Purpose of Electrical Investigation of the Ground). German Patent 481087, issued Oct. 24, 1929.

Determines equipotential lines of a field created by an alternating current by using, instead of one single probe, a probe comb consisting of several metallic rods arranged at small distances on a rod so that any one of them can be connected to the measuring apparatus by means of a slide.

Claims allowed - 3.

443. PIEPMEYER & CO., W., KOMMANDITGESELLSCHAFT (Kassel-Wilhelmshöhe, Germany). Verfahren zum Aufsuchen und zur Lagerbestimmung von Bodenteilen mit abweichender elektrischer Leitfähigkeit mit Hilfe in der Boden gesandter elektrischer Ströme (Method for Discovering and Determining the Position of Parts of the Ground Having Anomalous Electrical Conductivity by Means of Electrical Currents Dispatched into the Ground). German Patent 415188, issued June 22, 1925.

Measures direction and strength of the magnetic field produced at places above the surface of the ground or those accessible in the subsoil, in such a way that a wire-wound ring, capable of being turned in any position by means of three axes, is connected to a measurement device; to determine direction of the magnetic field first one axis, which at the same time is diameter of ring, is brought into such a position that by rotating the ring around this axis device for measuring current indicates absence of a current at any position of ring; after this, maximum value of induction is determined for position of ring-plane perpendicular to this position of axis.

Claims allowed - 2.

444. _____ Verfahren zur Ermittlung der Lage und Gestalt von nutzbaren Lagerstätten oder Gesteinsschichten mittels Beobachtung von Schallwellen (Method for Determining the Position and the Shape of Useful Deposits or Rock Strata by Observing Sound Waves). German Patent 479724, issued July 22, 1929.

Covers method for determining position and shape of deposits by means of observing sound waves propagated inside of earth. Method is characterized by variation of intensity of sound waves in suitable time intervals, so that any desired number of time intervals can be observed in various receiving stations. By corresponding shifting of receiving stations velocity of propagation to be compared can be determined in air as well as in earth strata at various depths; position and shape of these deposits can be established accordingly.

Claim allowed - 1.

445. _____ Vorrichtung zum Entsenden elektrischer Ströme in den Boden zwecks Aufsuchung und Lagenbestimmung von Bodenteilen mit abweichender elektrischer Leitfähigkeit (Arrangement for Dispatching Electrical Currents into the Ground for the Purpose of Discovering and Determining the Position of Deposits with Anomalous Electrical Conductivity). German Patent 408819, issued Jan. 27, 1925.

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Applies to device in which insulated electrodes are buried in ground at a considerable depth. For this a pipe, inside surface of which is covered with an insulating layer, is driven into the ground. Insulated cable passes through pipe and is connected with metallic, sharp end of pipe; connection with ground is established through this metallic end, which is insulated from pipe.

Claims allowed - 2.

446. PROSPEKTOR-INSTITUT FÜR PRAKTISCHE GEOPHYSIK UND GEOLOGIE DR. HÜLSENBECK & CO. (Frankfurt-am-Main). Einrichtung zur Registrierung bei geoelektrischen Untersuchungen mit einem komplexen Wechelstrom Kompensator (Device for Mechanical Registration in Geoelectric Investigations Carried on with a Complex Alternating-Current Compensator). German Patent 559452, issued Sept. 20, 1932.

Covers device for mechanical registration, at single points of measurement, upon a test-record sheet, of maximum values of energy component of current and of wattless component of current of alternating-current field produced in ground by probes or induction coils during geoelectric investigations carried on with a complex alternating-current compensator.

Claims allowed - 3.

447. _____ Verfahren und Einrichtung zur elektrischen Bodenforschung mit Wechselstrom nach der Induktionsrahmenmethode unter Verwendung eines komplexen Wechselstromkompensators (Method and Arrangement for Electrical Prospecting with Alternating Current According to the Induction-Frame Method by Using a Complex Alternating-Current Compensation). German Patent 536098, issued Oct. 19, 1931.

Applies fixed phase length, most suitable for electrical investigations, is applied to measuring current flowing through compensator.

Claims allowed - 5.

448. _____ Verfahren und Einrichtung zur elektrischen Bodenforschung mit Wechselstrom nach der Sondenmethode unter Verwendung eines komplexen Wechselstromkompensators (Method and Arrangement for Electrical Prospecting with Alternating Current According to the Probe-Method by Using a Complex Alternating-Current Compensator). German Patent 536097, issued Oct. 20, 1931.

Relates to method and arrangement for electrical prospecting in which a complex alternating current compensator is used. According to new arrangement, a fixed phase length, most suitable for electrical investigations, can be imparted to measuring current flowing through compensator.

Claims allowed - 5.

449. _____ Verfahren zur Bestimmung des magnetischen Vektors der künstlich erzeugten Erdströme nach Grösse und Richtung bei geophysikalischen Untersuchungen mittels Wechselströme, bei welchem allein die Grösse und Richtung der Erdstrom-Komponente gemessen wird (Method for Determining the Intensity and Direction of the Magnetic Vector of Artificially Produced Alternating Earth Currents in Geophysical Investigations by Measuring Only the Value and Direction of the Earth-Current Component). German Patent 490910, issued Feb. 3, 1930.

Describes method for determining intensity and direction of magnetic vector of artificially produced alternating earth currents by measuring only value and direction of earth-current component, described in this patent, consists in determining ratio of intensities of horizontal and vertical components.

Claim allowed - 1.

450. PROSPEKTOR-INSTITUT FÜR PRAKTISCHE GEOPHYSIK UND GEOLOGIE DR. HÜLSENBECK & CO. (Frankfurt-am-Main). Verfahren zur elektrischen Bodenerforschung (Method for Electrical Investigation of the Ground). German Patent 489434, issued Jan. 17, 1930.

Concerns proceeding for electrical investigation of ground by which electrical momentary waves are conducted to ground and progress in space and time of distribution of momentary waves is determined at any point of area under investigation by means of high-frequency oscillographs.

Claims allowed - 3.

451. RAVEN, EDUARD (Gelsenkirchen, Germany). Verfahren zum Aufsuchen von Eisenerzlagern (Method for Discovering Iron-Ore Deposits). German Patent 344489, issued Nov. 22, 1921.

Is based on the fact that earth-magnetic lines of force at places of such deposits influence wire loops or coils (with or without an iron core) moved across terrain; weak induction currents thus produced are amplified by a suitable amplifier (for example, a cathode-tube amplifier) so that they can be perceived by telephone or similar device. Coil is suspended inside frame which can be rotated around axis perpendicular to axis of coil.

Claims allowed - 3.

452. _____ Verfahren zur Feststellung von Erz-Wasser-oder anderen Bodenschichten mit einer von der Umgebung abweichenden elektrischen Leitfähigkeit (Method for Determining Ore Layers, Water Levels, and Other Subterranean Layers the Electrical Conductivity of Which is Different from that of Materials Surrounding Them). German Patent 334626, issued Mar. 15, 1921.

Applies to method by which disturbances of electric current line field produced in ground by layers of electrical conductivity different from that of surrounding material, as well as position of disturbing mass, are determined by listening, on surface of earth or other accessible place, in telephone inserted into movable searching loop or coil. Device provided for amplifying current - for example, a cathode tube - is inserted into searching loop.

Claims allowed - 3.

453. _____ Verfahren zur Feststellung von Erz-Wasser-oder anderen Bodenschichten mit einer von der Umgebung abweichenden elektrischen Leitfähigkeit mittels elektrischer Wellen (Method for Determining, by Means of Electrical Waves, Ore Layers, Water Levels, and Other Subterranean Layers, the Electrical Conductivity of Which is Different from that of Materials Surrounding Them). German Patent 331426, issued Jan. 7, 1921.

Concerns method in which electric waves are emitted from two radio stations through ground toward common receiving station; from sound picture received in latter nature and extension of the disturbing body lying in path of waves can be determined.

Claim allowed - 1.

454. RAVEN, EDUARD (Gelsenkirchen, Germany). Verfahren zur Feststellung von Erz-Wasser-oder anderen Bodenschichten mit einer von der Umgebung abweichenden elektrischen Leitfähigkeit mittels elektrischer Wellen und Reflexion derselben (Method for Determining, by Means of Electrical Waves and Reflection, Ore Layers, Water Levels, and Other Subterranean Layers the Electrical Conductivity of Which is Different from That of Materials Surrounding Them). German Patent 331427, issued Jan. 7, 1921.

Covers method in which electrical waves are emitted from two radio stations through ground, and paths of waves, or their reflections, are determined by means of a receiving station situated at about an equal distance from two sending stations and adjusted to same sound.

Claim allowed - 1.

455. REITHOFFER, DR. MAX (Vienna, Austria). Einrichtung zur Auffindung und Feststellung verborgener oder unzugänglicher Metalle (Method for Discovering and Determining Hidden or Inaccessible Metals). German Patent 325467, issued Sept. 29, 1920.

Involves mutual connection of resonance coils, traversed by alternating currents of low and high frequency, in such a manner that changes caused by introduction of metallic masses into electrical or magnetic field of 1 or 2 of these coils of value equal to induced or effective ohm's resistance (damping) or of natural frequency of coils concerned, result in potential differences which can be measured or observed by known methods.

Claims allowed - 5.

456. RICHTER, RUDOLF HANS (Leipzig-Gohlis, Germany). Einrichtung zum Nachweis von leitenden Körpern (Arrangement for Detecting Conductive Bodies). German Patent 397698, issued June 28, 1924.

Detects conductive bodies in which not main oscillation is observed but an oscillation harmonic to it. This is obtained by superposing an auxiliary oscillation harmonic to fundamental one.

Claims allowed - 3.

457. _____ Einrichtung zum Nachweis von leitenden Körpern (Arrangement for Detecting Conductive Bodies). German Patent 398267, issued July 5, 1924.

The invention described in this patent relates to a method in which by means of arrangements between the turns of the coil used, or between the coils and the earth, such a capacity contact is obtained that changes in the effective capacity caused by approaching of human and animal bodies, as well as changes caused by other sources of disturbance, may become very small and practically harmless.

Claims allowed - 3.

458. RUHSTRAT, ERNST (Göttingen, Germany). Einrichtung zur Bestimmung der Lage von luftelektrischen Äquipotentialflächen zum Zwecke der elektrischen Bodenforschung (Apparatus for Determining the Position of Electrical Equipotential Surfaces for the Purpose of Electrical Investigation of the Ground). German Patent 475434, issued July 11, 1929.

This patent discloses a method for electrical investigation of the ground characterized by application of a highly sensitive electrometer, one part of which, preferably its case, serves as a collector.

Claim allowed - 1.

459. RUHSTRAT, GEBRÜDER (Göttingen, Germany). Einrichtung zur Bestimmung der raumlichen Lage der luftelektrischen Äquipotenialflächen und Potentialdifferenzen, insbesondere für die Zwecke der elektrischen Bodenerforschung (Arrangement for Determining the Spatial Position of Aerial Electrical Equipotential Surfaces and Potential Differences, Especially for the Purpose of Electrical Investigation of the Ground). German Patent 461908, issued July 2, 1928.

Places two collectors, rotatable vertically and horizontally about corresponding disks and connected by a line with an electrometer, in such a manner that inclination of line connecting two collectors toward a horizontal plane, its horizontal direction, and potential difference between two collectors can be read directly from apparatus.

Claims allowed - 3.

460. SCHILOWSKY, KONSTANTIN (Davosdorf, Switzerland). Verfahren und Vorrichtung zum Nachweis unterirdischer Erzlager oder von Grundwasser mittels elektrischer Schwingungen (Method and Arrangement for Determining Subterranean Ore Deposits or Underground Water by Means of Electrical Oscillations). German Patent 322040, issued June 19, 1920.

Applies to method by which long waves are emitted over large subterranean areas to great distances in a horizontal direction as well as in depth, by means of a sending apparatus (for example an antenna sender); wave energy produced by these waves, after having met an orebody and being scattered by it, is caught on surface in proximity to deposit by means of portable receiving apparatus, latter being protected from effect of primary field of sending apparatus.

Receiving apparatus serving to catch energy scattered by orebody consists of closed resonance currents with large-diameter solenoids; these solenoids are protected from the effect of the primary waves emitted by the sender by arranging them so that area of turn coincides with direction of magnetic vector of primary waves.

Claims allowed - 2.

461. SCHLUMBERGER, CONRAD (Paris, France). Verfahren zur Bestimmung des Beschaffenheits des Erdbodens mittels Elektrizität (Method for Determining the Character of the Soil by Means of Electricity). German Patent 269928, issued Feb. 5, 1914.

Determines character of soil by following series of steps: (1) Obtaining around two points (electrodes) on surface of earth, equipotential curves and comparing them with equipotential curves determined theoretically for homogeneous ground; (2) determining equipotential curves produced by polarization at borders of an ore deposit; (3) preventing disturbances caused by earth currents, polarization of electrodes, etc., by periodical commutation of current flowing between electrodes; (4) determining potentials of ground by means of a movable line in which a galvanometer is included, line being provided at both ends with metallic rods inserted into a porous receptacle filled with a concentrated solution of copper sulphate or similar salt, to establish a nonpolarizing earth-connection; (5) determining the relative potential drop between the equipotential curves with respect to the potential drop between two fixed points on the ground by means of a suitable method of measurement (Wheatstone bridge).

Claims allowed - 5.

462. SCHLUMBERGER, CONRAD (Paris, France). Verfahren zur Bestimmung der Beschaffenheit des Erdbodens mittels Elektrizität (Method for Determining the Character of the Soil by Means of Electricity). German Patent 272603.(addition to patent 269928), issued Apr. 6, 1914.

Determines equipotential curves which result from polarization currents produced by ore deposits and metallic masses hidden in moist ground without being influenced by artificial sources of current.

Claim allowed - 1.

463. SEISMOS GESELLSCHAFT M. B. H. (Hanover, Germany). Verfahren zur Bestimmung der Tiefe von Einlagerungen im Erdboden (Method for Determining the Depth of Deposits in the Ground). German Patent 440106, issued Jan. 29, 1927.

Concerns method for determining depth of deposits from deformation of field of lines of force. A straight cable is put over ground and covered with earth on both ends. Current field is studied by means of secondary electrodes. Distance between electrodes can be increased gradually; electrodes may be disposed symmetrically or asymmetrically with respect to source of current placed in center. By measuring electric field for every position of electrodes, a sudden and strong change of this field will indicate presence of deposit and will make determination of its depth possible.

Claim allowed - 1.

464. _____ Verfahren zur Bestimmung des Abstandes einer reflektierenden Fläche mittels elektromagnetische Wellen, insbesondere zur Feststellung der Lage elektrisch leitender Flächen in der Erde (Method for Determining the Distance from a Reflection Surface by Means of Magnetic Waves, Especially for Determining the Position of Electrically Conductive Surfaces in the Ground). German Patent 458097, issued Apr. 4, 1928.

Applies to device in which deviation of waves of different lengths emitted from a fixed sending station and received by a fixed frame antenna, serving as receiving station, is investigated in connection with phase difference.

Claims allowed - 3.

465. _____ Verfahren zur Feststellung und Lokalisierung von Körpern im Untergrunde (Method for Determining and Locating Subterranean Bodies). German Patent 442832, issued Apr. 8, 1927.

Describes method for determining and locating subterranean bodies, electrical conductivity and dielectric constant of which are anomalous with respect to masses surrounding them. Investigation is done by measuring phase difference at various points on ground by means of electrodes.

Claims allowed - 2.

466. SOCIETE DU PROSPECTION ÉLECTRIQUE, PROCEDÉS SCHLUMBERGER (Paris, France). Verfahren zum Erkennen der durch tiefbohrlöcher durchteuften Bodenschichten mittels elektrischer Widerstandungsmessung (Method of Investigating Layers of the Ground Penetrated by Boreholes by Means of Measuring the Electrical Resistance). German Patent 534563, issued Sept. 28, 1931.

Relates to method by which local electrical specific resistance at various depths is obtained by lowering measuring apparatus into a drill hole. Provides for three electrodes connected to isolated cables of different lengths and lowered into hole; one of three electrodes is connected with source of current, and two others serve as probes.

Claims allowed - 2.

467. _____ Verfahren zur Bestimmung des Fallsinnes von Sedimentschichten (Method for Determining the Sense of the Dip of Sedimentary Layers). German Patent 552090, issued June 9, 1932.

Refers to method for determining sense of dip of sedimentary layers in which electrodes connected by a rectilinear line and fed by alternating current are so arranged that their interconnecting lines are directed along deposit. Inclination of magnetic alternating field of ground currents is determined by means of induction coil at correct prolongation of line connecting electrodes.

Claim allowed - 1.

468. _____ Elektrisches Verfahren und Anordnung zur Bestimmung von porösen, durch ein Bohrloch durchschlagenen Schichten (Electrical Method and Apparatus for Determining Porous Layers Penetrated by a Borehole). German Patent 592351, issued Feb. 7, 1934.

Refers to the method of determining porous layers penetrated by boreholes by means of electrical probe measurements at various depths lowered in the pipeless part of the hole filled with water. The potential differences produced by the circulation of the waters through the porous layers, without the use of any artificial electric current conducted into the subsoil, are measured.

Claims allowed - 4.

469. SOCIÉTÉ INDUSTRIELLE DES PROCÉDÉS W.-A. LOTH (Paris, France). Verfahren zum Auffinden leitender Massen im Erdboden durch elektrischen Wechselstrom, der an zwei Stellen dem Boden zugeführt wird (Method for Disclosing Conductive Subterranean Masses by Means of Electric Alternating Current Passed into the Ground at two Points). German Patent 417663, issued Aug. 14, 1925.

Determines earth currents produced by means of a line, ends of which are connected to ground, by means of their induction effect upon coil. Particular properties of ground are disclosed by course of magnetic lines of force. Cardan suspension of coil characterizes this method. System of three frames adjusted perpendicularly one to another is used.

Claims allowed - 4.

470. SVENSKA RADIOAKTIEBOLAGET (Stockholm, Sweden). Verfahren zur Bodenerforschung auf elektromagnetischen Wege, bei welchem dem Boden Wechselstrom galvanisch zugeführt und die Stärke des von ihm erzeugten magnetischen Feldes mit Hilfe einer Induktionsspule ermittelt wird (Method for Electromagnetic Investigation of the Ground, in Which the Alternating Current is Passed into the Ground Galvanically and the Strength of the Magnetic Field Produced by it is Determined by Means of an Induction Coil). German Patent 463245, issued July 26, 1928.

Describes method in which electromagnetic investigation of ground is carried out with aid of induction coil. Potential difference produced in coil by induction is measured with tubular voltmeter.

Claim allowed - 1.

5. Radioactive Methods

471. DESSAUER, DR. FRIEDRICH (Frankfurt-am-Main, Germany). Ionisationskammer der in einem Gasraum durch die Wellen, bzw. Korpuskularstrahlen hervorgerufenen Ionisation und insbesondere für die Untersuchungen, die auf selektiver, von einem Kammer eingeschlossenen Prüfkörper ausgehender Sekundärstrahlung beruhen (Ionization Chamber for Measuring Ionization Produced in a Gaseous Space by Wave-Radiation or Corpuscular Radiation and Especially for Investigations Based on Selective Secondary Radiation Emitted from Test Bodies Inclosed in the Chamber). German Patent 559243, issued Sept. 23, 1932.

Relates to application of principle by which elimination of harmful wall radiation is obtained. Wall radiation is reduced to a minimum by building walls of two or more layers of such kinds of material, owing to properties of which radiation emitted by one layer is absorbed by other.

Claims allowed - 2.

472. KOLHÖRSTER, DR. WERNER (Berlin-Friedenau, Germany). Verfahren zur Bestimmung des Kaliumgehaltes im Erdreich, in Ablagerungen, technischen Produkten u. dgl. (Method for Determining the Content of Potassium in the Earth, in Deposits, Technical Products, etc.). German Patent 536006, issued Feb. 2, 1932.

Concerns method for determining content of potassium in earth, etc., by which gamma radiation emanated by potassium acts upon a measuring instrument; ionization produced within this measuring instrument serves for determining specific content of potassium.

Claims allowed - 2.

6. Unclassified Methods

473. ASKANIA-WERKE, AKTIENGESELLSCHAFT (formerly Centralwerkstatt Dessau) AND BAMBERG-FRIEDENAU, CARL (Berlin-Friedenau, Germany). Integrometer. German Patent 568474, issued Jan. 24, 1933.

Concerns device designed for calculation of integrals, especially those serving for evaluation of geophysical field data, such as:

$$\int f\ (r)\ \sin n \varphi\ d\ r\ , \text{ and}$$

$$\int f\ (r)\ \cos n \varphi\ d\ r$$

in which f (r) is a given function of section of guide ray (Leitstrahlabschnitt) r, φ angle of guide ray in a plane coordinate system, and n is any number.

Claims allowed - 46.

474. BRANNOLTE, FRIEDRICH (Delmenhorst, Oldenburg, Germany). Apparat zum Aufsuchen von Bodenschätzen, wie Kohle, Erdol, Salz, Eisenerz, usw., mittels auf desselben ansprechender, in horizontaler ebene ansschwingender Substanzen (Apparatus for Disclosing Deposits, such as Coal, Oil, Salt, Iron Ore, etc., by Means of Substances Influenced by Them and Swinging in Horizontal Plane). German Patent 431329, issued July 7, 1926.

Consists of cylindrical box in which a frame, provided with an index and case-holder, is suspended by means of silk threads so that case can swing in a horizontal plane. Special cases are to be used for discovering different kinds of deposits.

Claim allowed - 1.

475. LAUBMEYER, DR. GÜNTHER (Kassel-Wilhelmshohe, Germany). Verfahren und Vorrichtung zum Aufsuchung von Lagerstätten (Method and Apparatus for Discovering Deposits). German Patent 567698, issued Jan. 7, 1933.

Applies to apparatus by which ground air can be caught and its gaseous constituents examined quantitatively. Only those gases, especially hydrocarbons, are measured which, owing to their small molecular weight, diffuse easily from great depths to surface of earth.

Claims allowed - 3.

FRENCH PATENTS

1. Gravitational Method

476. SOCIÉTÉ CARL ZEISS (Germany). Pendule destiné à des mesures de gravité (Pendulum Designed for Gravity Measurements). French Patent 732896, issued Sept. 27, 1932.

Covers pendulum with special adjusting or regulating screws. Axes of screws parallel axis of suspension of pendulum. Desired adjustment is obtained by selection of lengths of screws.

Claims allowed - 2.

2. Magnetic Methods

477. AMBRONN, RICHARD (Germany). Dispositif pour la détermination complète de la direction et de l'intensité de champs magnétiques, notamment du champ magnétique naturel de la terre (Apparatus for Perfect Determination of the Direction and the Intensity of Magnetic Fields, Especially of the Natural Magnetic Field of the Earth). French Patent 681671, issued May 17, 1930.

Is based on principle of Lloyd's balance. Three components of magnetic field of earth are determined by compensating with controllable measurable electromagnetic field changes of inclination of a dipping needle produced by turning magnet in several measured angles in horizontal plane.

Claims allowed - 9.

478. HAUSER & CO., G. m. b. H. (Germany). Balance magnetométrique (Magnetic Balance). French Patent 743724, issued Apr. 5, 1933.

Relates to magnetic balances with two telescopes, optical axes of which in plane of oscillation are inclined at equal angles with regard to reflecting surface. By looking through one of these telescopes image produced by other telescope can be observed. One telescope is provided with a graduation scale and other with a mark. Graduation scale and mark coincide when image is observed.

Claims allowed - 6.

479. _____ Système magnétique pour balances magnétiques (Magnetic System for Magnetic Balances). French Patent 743725, issued Apr. 5, 1933.

Relates to mounting of oscillating magnetic system which is not affixed at two sides of bar magnets but is adjusted between magnets.

Claims allowed - 17.

480. ROSSET, VICTOR (Savoy, France). Procédé et appareil pour la recherche des minerals, des sources, et autres applications similaires (Method and Apparatus for Prospecting for Minerals, Sources of Water, and Other Similar Applications). French Patent 734234, issued Oct. 18, 1932.

Covers method of prospecting for subterranean waters, minerals, etc., by means of magnetic needle placed within ring magnet, latter producing necessary magnetic field. Existence of water, minerals, etc., is established by declination of needle.

Claims allowed - 3.

3. Seismic Method

481. ANGLO-PERSIAN OIL CO. (LTD.) (England). Perfectionnements apportés aux sismographs et autres instruments de mesure (Improvement Made on Seismographs and Other Measuring Instruments). French Patent 686537, issued July 28, 1930.

Concerns devices assigned for measuring small displacements or feeble electric currents in seismographs or other measuring instruments, Comprises a magnet provided with mirror so that a change in direction of magnetic lines produces a rotation of mirror.

Claims allowed - 7.

4. Electrical Methods

482. AMBRONN, RICHARD (of Germany). Procédé pour la détermination de la répartition locale de la capacité conductrice d'électricité dans le sous-sol (Method for Determining the Local Distribution of the Conductive Capacity of Electricity in the Subsoil). French Patent 622108, issued May 24, 1927.

This invention relates to the method for determining the local distribution of the conductive capacity of the subsoil by means of alternating electric currents. Means are provided and arrangements established for measuring, after the alternating current is sent into the ground, the direction, intensity, angular displacement, as well as local distribution of various component.

Claims allowed - 10.

483. ______ Procédé pour produire dans le sol des courants disséminés à champ électromagnétique d'ellipticité quelconque en vue de l'étude de la structure géologique du sous-sol (Method for Producing in the Soil Currents Disseminated by Means of Any Elliptical Electromagnetic Field for the Purpose of Studying the Geological Structure of the Subsoil). French Patent 681670, issued May 17, 1930.

Produces elliptically polarized electromagnetic field serving for exploring subsoil by means of two systems of alternating current of equal frequency but different phases displaced at a constant and adjustable angle.

Claims allowed - 5.

484. COMPANIE GÉNÉRALE DE GÉOPHYSIQUE (residing in France, Seine). Perfectionnement aux méthodes de prospection électrique du sous-sol (Improvement in the Electrical Methods for Prospecting). French Patent 766744, issued July 3, 1934.

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This invention relates to the electrical method of prospecting in which the differences of the potential produced by the ground currents may be measured without the necessity of using arbitrary currents sent into the ground for this purpose by the operator. This is accomplished by measuring the differences of potential caused by the ground currents between the points on the surface of the ground united in pairs at a moment when these currents have a given direction; these differences of potential are compared with the differences of potential taken at the same moment between two fixed points.

Claims allowed - 4.

435. "ERDA" MAATSCHAPPIJ VOOR WETENSCHAPPELIJK AARDLAGENONDERZOEK (of Netherlands). Appareil pour détecter les masses de conductibilité électrique anomale que renferme la terre et déterminer leur position (Apparatus for Detecting Masses of Abnormal Electric Conductibility Hidden in the Ground and Determining Their Location). French Patent 555013, issued May 11, 1923.

This invention relates to an apparatus for detecting masses of abnormal conductibility hidden in the ground. The distribution of the electrical potential or the form of the equipotential lines are determined on the surface of the ground or along the boreholes between the electrodes located suitably with respect to the objects under investigation.

Claim allowed - 1.

436. ______Procédés pour découvrir les gisements terrestres précieux (Method for Discovering Valuable Deposits in the Ground). French Patent 565688, issued Feb. 2, 1924.

This invention relates to a method for discovering valuable deposits. It is based on determining the distribution of the currents and electrical tension in the ground, and consists of examining the distribution of the electricity in the ground under the influence of a direct current, either natural or produced artificially, of an alternating current of low frequency, and of an alternating current of high frequency. Independently of the kind of the current, the current is transmitted to the ground to be examined by means of a system of electrodes consisting of a central electrode and several additional electrodes encircling it and connected with the central electrode.

Claim allowed - 1.

437. ______Procédé pour faciliter la découverte de gisements à l'aide d'ondes élastiques périodiques (Method for Facilitating the Discovery of Deposits with the Aid of Periodical Elastic Waves). French Patent 565689, issued Feb. 2, 1924.

This invention relates to a method for facilitating the discovery of deposits by observing the effect of earthquakes produced artificially. The method consists of sending periodically into the ground elastic waves and observing the manner in which the intensity of radiation recorded by seismographs at various points varies in function of the frequency of emission and propagation of the waves in the ground by comparing the phases of the waves passing through different points in the ground.

Claim allowed - 1.

488. "ERDA" MAATSCHAPPIJ VOOR WETENSCHAPPELIJK AARDLAGENONDERZOEK (of Netherlands). Procédé pour déterminer si une eau souterraine contient du sel (Method for Determining Whether Subterranean Water Contains Salt). French Patent 565691, issued Feb. 2, 1924.

This invention relates to a method for determining whether subterranean water contains salt. The method consists of emitting electromagnetic waves through the ground to be investigated, preferably waves of different lengths, and of determining the components of the magnetic force of the electromagnetic waves returning from the interior of the ground. The apparatus emitting electromagnetic waves is disposed with respect to the receiving apparatus in such a way that the latter is placed in the direction of the most feeble radiation.

Claim allowed - 1.

489. _____Procédé pour découvrir les, gisements terrestres à l'aide d'ondes électromagnétiques (Method for Discovering Underground Deposits by Means of Electromagnetic Waves). French Patent 565692, issued Feb. 2, 1924.

This invention relates to a method for determining the location of underground deposits differing from the rocks adjoining them by their electrical or dielectrical properties. The method consists of sending through the ground to be examined electromagnetic waves produced by a transmitting apparatus and of determining the direction of the waves at one or several receiving stations by means of receiving apparatus.

Claim allowed - 1.

490. _____Procédé pour la recherche des zones souterraines se distinguant de leur entourage par leur conductibilité électrique (Method of Prospecting Subterranean Zones Differing in Their Electrical Conductivity from Those Surrounding Them). French Patent 567221, issued Feb. 27, 1924.

This invention relates to a method of prospecting for subterranean bodies, the electrical conductibility of which differs from that of the bodies surrounding them, by sending electric currents across the zone of exploration and by determining the course of the current lines, equipotential lines, etc. If there are in the zone under exploration known deposits or disturbing formations these deposits and disturbing bodies may be isolated by using one or several auxiliary electrodes suitably distributed. In certain cases good results may be obtained by using the mineral deposit itself as an auxiliary electrode by connecting it directly to one of the main electrodes.

Claim allowed - 1.

491. HAUSER & CO., B. M. B. H. (Germany). Procédé et dispositif pour la recherche des minerals (Method and Apparatus for Exploiting Minerals). French Patent 743726, issued Apr. 5, 1933.

Applies to exploration for minerals; consists of touching ground with one electrode and of determining, as soon as search-electrode comes in contact with a metallic body or a mineral, difference of potential produced in a closed circuit by means of an electrolyte, for example, by water, with regard to a second electrode, electrical properties of which are similar to those of first electrode.

Claims allowed - 4.

492. _____Procédé pour projeter, sur un plan des régions de sous-sol qui ne sont pas homogénes au point de vue de la conductibilité électrique (Method for Projecting on a Plan the Areas of the Subsoil Which are Not Homogeneous from the Viewpoint of Electrical Conductivity). French Patent 704239, issued May 15, 1931.

Relates to method of electrical prospecting in which equipotential lines measured are compared with theoretical lines or with those determined for a homogenous subsoil. Method consists in determining on measured equipotential lines respective positions of all points equidistant from corresponding theoretical equipotential lines or from lines obtained for a homogeneous subsoil; distances are measured vertically or horizontally.

Claims allowed - 2.

493. KOESSLER, ALPHONSE (residing in France, Bas-Rhin). Nouvelle méthode de prospection et dispositif pour sa mise en oeuvre. (A New Method of Prospecting and the Apparatus Used). French Patent 758393, issued Jan. 15, 1934.

Relates to new electrical method of prospecting. Consists of transforming changes of electrical intensity resulting from differences of conductivity of subsoil investigated into luminous intensities; of representing variations of luminous intensities by means of neon lamps or other suitable means; and of producing them on a film, a plate, or sensitized paper.

Claims allowed - 3.

494. LAUGIER, EMMANUEL (France). Dispositif électromagnetique pour la recherche des eaux souterraines (Electromagnetic Device for Research into Underground Waters). French Patent 735454, issued Nov. 9, 1932.

Refers to portable device with aid of which existence of subterranean waters can be determined in coordination with natural aptitude of operator. Contains electrical source of energy (battery, induction coil, etc.) inclosed in a holder; latter is surmounted by two receptacles, one above other. Lower contains magnet, magnetic field of which acts upon upper receptacle, movable about lower one. Two graduation scales and an index serve for reading and comparing grades, based on which determinations are made.

Claim allowed - 1.

495. LÖWY, HEINRICH (Austria). Procédé de prospection de la croûte terrestre (Method of Prospecting the Earth's Crust). French Patent 657367, issued May 22, 1929.

Concerns prospecting of earth's crust and is characterized by measuring at least two electrical values, one of which (the proper length of the wave of an electrical oscillator, angle of reflection, position of an extreme value of interference) depends, in case of presence of a conductive layer, only on distance from this layer, and other (damping on amplitude of vibrations of oscillator) of which depends besides on nature of material.

Claims allowed - 5.

496. MINES DOMANIALES DE POTASSES D'ALSACE (Haut-Rhin, France). Procédé et dispositif de recherches géophysiques permettant de reconnaître et d'explorer le sous-sol (Method and Apparatus for Geophysical Prospecting by Which It Is Possible to Investigate and Explore the Subsoil). French Patent 685487, issued July 10, 1930.

Consists mainly in measuring earth resistance between two electrodes. The resistance of the earth is calculated from the maximum readings of the voltmeter.

Claims allowed - 3.

497. MÜLLER, C. H. F., AKTIENGESELLSCHAFT (Germany). Dispositif de mesure ou de controle de l'intensité de radiations (Device for Measuring and Controlling the Intensity of Radiations). French Patent 735221, issued Nov. 4, 1932.

Consists mainly of electric circuit by which oscillations of relaxation are produced. Carries a capacity, a circuit provided with a rheostat by which this capacity is charged, and a discharge circuit; latter contains a circuit of electrical discharge and a conductor, resistance of which decreases under action of utilized radiation.

Claim allowed - 1.

498. SCHLUMBERGER, CONRAD (of France, Seine). Procédé pour la détermination de la nature du sous-sol au moyen de l'électricité (Method for Determining the Structure of the Subsoil by Means of Electricity). French Patent 450784, issued Apr. 3, 1913.

This invention relates to a method for determining the structure of the subsoil; it consists of drawing on the surface of the ground a map of potentials near two points between which a constant or variable difference of potential is applied by means of a suitable generator and an insulated conducting line, and of comparing the differences between the map obtained in this way and a map drawn over a homogeneous ground known a priori.

Claim allowed - 1.

499. ______Procédé pour la détermination de la nature du sous-sol au moyen de l'électricité (Method for Determining the Structure of the Subsoil by Means of Electricity). French Patent 460179, issued Nov. 25, 1913.

This invention relates to a method for determining the structure of the subsoil and consists of drawing a map of potentials and comparing this map with the map of potentials drawn over a known homogeneous ground.

Claim allowed - 1.

500. SCHLUMBERGER, CONRAD (of France, Seine). Procédé d'investigation du sous-sol (Method of Prospecting the Subsoil). French Patent 524577, issued Sept. 7, 1921.

This invention relates to a method of prospecting the subsoil and consists essentially of emitting Hertzian waves by any suitable antenna, and of observing the effects of the induction manifested by the conducting body under investigation upon a suitable receiving apparatus located so that not to be directly influenced by the waves emitted by the antenna.

Claim allowed - 1.

501. _____Procédés pour la détermination des gites pétrolifères (Method for Determining Oil Deposits). French Patent 615290, issued Jan. 4, 1927.

This invention relates to a method consisting of prospecting for oil by measuring the electrical conductivity of the ground and by determining from the observations obtained in this way the points of maximum salinity, that is the point in which oil and gas may be expected. The method is realized in practice by making a series of systematic measurements of electrical conductivity of the ground under investigation and then by comparing the results obtained and selecting zones of maximum conductivity.

Claim allowed - 1.

502. SOCIÉTÉ DE PROSPECTION ÉLECTRIQUE, PROCÉDÉS SCHLUMBERGER (of France, Seine). Procédé pour la détermination de la profondeur des venues d'eau dans les sondages (Method for Determining the Depth of Water Flowing into the Boreholes). French Patent 673872, issued Jan. 21, 1930.

This invention relates to the electrical method for determining the depth of water flowing into a borehole. The method consists of lowering into a borehole gradually a metallic electrode suspended to an insulated conductor and of measuring the variation of the electromotive force between the electrode and the water filling the borehole at the moment when this electrode traverses the aqueous horizon.

Claims allowed - 4.

503. _____Procédé électrique et appareil pour la détermination des terrains traversés dans les sondages (Electrical Method and Apparatus for Determining the Formations of the Ground Traversed by Borings). French Patent 678113, issued Mar. 19, 1930.

This invention relates to "electrical coring" by which the mechanical coring is to be replaced. The method consists of measuring from the surface of the ground at different depths, in the non-tubed part of the hole, the electrical resistivity of rocks traversed by drilling and of drawing with the aid of the data obtained in this way a diagram showing the electric parameter of various rocks.

Claim allowed - 1.

504. SOCIÉTÉ DE PROSPECTION ÉLECTRIQUE PROCÉDÉS SCHLUMBERGER (of France, Seine). Dispositif électrique pour la prise de carottes sur la paroil latérale des sondages (Electrical Device for Taking Cores from the Walls of Boreholes). French Patent 752257, issued Sept. 20, 1933.

Refers to a device by which it is possible to draw conclusions, at any moment and at any depth, on charges in structure of subsoil penetrated by drilling. Thus cores can be taken at the horizons considered important from geological viewpoint.

Carrying out of work conforms with proceedings described in French patents 678113 and 728592.

Claims allowed - 8.

505. _____Procédé électrique et appareil pour la determination des terrains traverses dans les sondages (Electrical Method and Apparatus for Determining the Structure of the Ground Penetrated by Drilling). French Patent 678113, issued Mar. 19, 1930.

Relates to method by which mechanical coring is replaced by electrical coring. Practical execution of this method consists of lowering into nontubed part of borehole electrode connected by insulated wire with source of electric current. Difference of potential between two points inside borehole at different heights is measured by means of two other electrodes provided with insulated wires and connected with measuring instruments placed on surface of ground.

Claim allowed - 1.

506. _____Procédé et appareillage pour la reconnaissance géologique des terrains et plus particuliérement des couches poreuses recoupés par un sondage (Method and Apparatus for Geological Examination of the Ground, Especially of Porous Layers, Penetrated by Boring). French Patent 723592, issued Apr. 11, 1932.

Refers to method and apparatus for studying, by measurements of potential inside borehole, various layers penetrated by boring (especially porous layers), and determining their depth, thickness, and pressure, thus avoiding mechanical coring.

Apparatus consists of potentiometer placed above ground and connected by means of isolated cables with two nonpolarizable electrodes, one of latter touching ground near mouth of the hole and other being lowered at various depths.

Claim allowed - 1.

507. _____Procédé et appareil pour la mesure de la deviation des sondages (Method and Apparatus for Measuring the Deviation of Boreholes). French Patent 742430, issued Mar. 7, 1933.

Determines deviation of borehole from vertical by measuring angle of inclination and azimuth between horizontal projection of axis of borehole and north direction.

By method described, the angle of inclination and azimuth of inclination can be found simultaneously.

Method is based on use of induction needle put in rotation by means of electric motor and on measuring of induced electromotive forces which arise in this needle under action of terrestrial magnetic field or under action of small magnetized pendulum.

Claim allowed - 1.

508. SOCIÉTÉ DE PROSPECTION ÉLECTRIQUE PROCÉDÉS SCHLUMBERGER (of France, Seine). Procédé et appareil pour la prospection électromagnétique du sous-sol (Method and Apparatus for Electromagnetic Prospecting of the Subsoil). French Patent 679817, issued Apr. 17, 1930.

Concerns method of prospecting in which differences of potential and therefore differences of specific resistivities in several points of area under investigation are indicated, producing these differences in soil by applying to area variable magnetic field and measuring differences of potential produced in soil by induction. Apparatus for practical carrying out of method consists of a measuring instrument, such as an alternating-current voltmeter, an apparatus for direct current combined with a rectifier, potentiometer, or similar apparatus.

Claim allowed - 1.

509. ______Procédé et appareils pour la recherche des gisements ou des roches magnétiques (Method and Apparatus for Prospecting Deposits or Magnetic Rocks). French Patent 710760, issued Aug. 28, 1931.

Measures gradient of component of magnetic field by using induced current produced in a circuit composed of two similar and parallel windings of differential connection and jointed to a measuring apparatus (galvanometer or a similar one); this circuit being switched on in terrestrial magnetic field; any deviation of galvanometer will show existence of local magnetic anomaly.

Claim allowed - 1.

510. ______Procédé pour la détermination de la direction et du sens du pendage des couches sédimentaires (Method for Determining the Direction and the Sense of the Dip of Sedimentary Layers). French Patent 708090, issued July 20, 1931.

Relates to method for determining direction and sense of dip of sedimentary layers. Transmits electric currents into ground by means of two point-electrodes connected with a source of electricity. Electrical and magnetic fields produced thus on surface of ground are studied to determine: (1) Small axis of symmetry of electric field by which direction of dip is shown, and (2) inclination of magnetic vector by which sense of dip is established.

Claim allowed - 1.

511. SOCIÉTÉ DE PROSPECTION ÉLECTRIQUE, PROCÉDÉS SCHLUMBERGER (of France, Seine). Procédé thermométrique pour la determination des circulations de fluides dans les sondages. (Thermometric Method for Determining the Circulation of Fluids in Wells). French Patent 759265, issued Jan. 31, 1934.

Relates to utilization of thermal phenomena produced within a well by the circulation of fluids. The measurements are carried into effect continuously in the part of the well to be investigated and are manifested by a continuous diagram of temperatures along this part of the well. A suitable electrical thermometer (resistance thermometer or a thermocouple), connected with the registering apparatus on the surface of the earth, is moved accordingly inside of the well.

Claims allowed - 4.

512. _____Procédé et Appareillage électrique pour diagnostiquer la nature des terrains, en particulier des couches pétrolifères et aquifères, recoupés par un sondage. (Electrical Method and Apparatus for Determining the Nature of the Rocks, especially Petroliferous and Aquatic Layers, Penetrated by Boring). French Patent 762016, issued Apr. 3, 1934.

This invention relates to the electrical method for determining the nature of the rocks, especially petroliferous and aquatic layers, penetrated by boring and consists of producing residual potential in a borehole containing liquid conducting body, of measuring this residual potential at various points of the hole, and of determining in this way the nature of the layers at these various points.

Claims allowed - 5.

513. SOCIÉTÉ GÉOPHYSIQUE DE RECHERCHES MINIÈRES (France). Procédé et appareils destinés à la prospection du sous-sol (Method and Apparatus Designed for Prospecting the Subsoil). French Patent 712477, issued Oct. 2, 1931.

Utilizes mechanical waves produced by series of vibrations determined in frequency and amplitude, instead of seismic waves produced by explosion or by fall of weight. More closely, invention refers to application of mechanical waves produced by apparatus using piezo-electric crystals, such as quartz, or by apparatus using magnetic bars put in vibration by suitable electromagnetic influence, according to phenomena described by Page, Delezenne, Marian, Matteuchi, and others.

Claims allowed - 13.

514. SUNDBERG, KARL (of Sweden). Perfectionnements aux modes de recherches de minerais au moyen d'ondes électromagnétiques (Improvements in the Methods of Prospecting for Minerals by Means of Electromagnetic Waves). French Patent 556867, issued July 28, 1923.

This invention relates to the methods of prospecting for minerals consisting of determining at various points the intensity of the electromagnetic waves transmitted from a station by means of one or several receiving stations, the antennas being located on the region under investigation.

Claim allowed - 1.

515. TURENNE, LOUIS (Seine, France). Procédé permettant de deceler la presence de certains corps, dans le sol ou ailleurs, et d'étudier leur propriétés (Method for Disclosing the Presence of Certain Bodies in the Ground or Elsewhere and for Studying Their Properties). French Patent 704353, issued May 19, 1931.

Makes it possible to establish whether a body has only one kind (positive or negative) of electricity or has both kinds of electricity. Spectra of waves called "pendulum waves" can be traced by method to which invention is related.

Claims allowed - 2.

516. ______Procédé Permettant de déceler la presence de certains corps dans le sol ou ailleurs, et d'etudier leur propriétés. (Method for Disclosing the Presence of Certain Bodies in the Ground or Elsewhere and for Studying Their Properties). French Patent 42464/704353, issued May 2, 1933.

The improvements to which this invention relates consist of combining the detector having a V-form, with a magnetic needle placed at one of its branches; by changing the direction of the point of the needle with respect to the detector more characteristics of the body under investigation may be obtained.

Claims allowed - 4.

5. Radioactive method

517. SOCIÉTÉ ANONYME ROBIVIR (Rhone, France) (inventors, Hugues-Emile-Joseph Roche and Leon-Marie-Antoine Bidreman). Méthode et appareil servant à modifier la disposition des radiations d'un corps et plus particuliérement son application à la recherche et à la prospection du sous-sol (Method and Apparatus Serving to Modify the Disposition of Radiations of a Body, in Particular Its Application for Investigating and Prospecting the Subsoil). French Patent 668308, issued Nov. 7, 1929.

Concerns method and apparatus by which modifications in position of negative electrons and of free positive ions of a body, and possibly also changes in their velocities and their paths, may be created. Therefore invention makes it possible to modify radiations emitted by this body by exposing it to an electrostatic field.

Claims allowed - 2.

6. Geothermal method

518. ANGLO-PERSIAN OIL CO. (LTD.) (England). Perfectionnements apportés aux enregisteurs de températures utilizables dans les puits profonds et pour des applications analogues (Improvement Made on Temperature-Registering Devices for Using Them in Deep Wells or for Similar Purposes). French Patent 706947, issued July 1, 1931.

Incloses temperature-registering device in envelope of cylindrical or other strong construction. Envelope is lowered into well by cable. Adjustment of device can be made without necessity of taking it from envelope.

Claims allowed - 2.

RUSSIAN PATENTS

1. Gravitational Methods

519. NECHIPORENKO, P. K., AND FEDUKOVICH, V. S. (U.S.S.R.). (Gravitational Variometer). Russian Patent 99958, issued July 31, 1933.

Applies to apparatus for damping oscillations of beam. Beam is made in form of a hollow cylinder suspended to a thread passing along axis of beam; beam is provided with a metallic ring placed in field of action of magnets or electromagnets.

Claim allowed - 1.

520. SABANEEV, K. D. (U.S.S.R.). (Gravitational Balance). Russian Patent 14274, issued Mar. 31, 1930.

Puts gravitational balance under bell from which air can be partly exhausted; special arrangement for reading is made, and a polished ball, serving as an artificial illuminating point, is used to photograph recording of indications of balance.

Claims allowed - 3.

521. USPENSKI, D. G. (U.S.S.R.). (Gravitational Variometer). Russian Patent 99270, issued Aug. 1933.

This invention relates to a gravitational variometer with two weights fixed at different heights and having short period of proper oscillations. To make the apparatus insensitive to curvatures the masses of the weights are distributed with respect to the axis of rotation and the vertical plane passing through the axis of the beam in such a way that the difference between the moment of the inertia of the system and the doubled square moment with regard to the plane is about equal to zero.

Claim allowed - 1.

2. Magnetic Methods

522. ALPIN, D. M. (U.S.S.R.). (Arrangement for Prospecting). Russian Patent 41090, issued Jan. 31, 1935.

This invention relates to prospecting for ores by measuring the horizontal and vertical gradients of the magnetic field passing through the ground with low frequency currents. In order to obtain the logarithmic gradients of the magnetic field of earth-currents two frames lying in the same plane and rigidly connected one with another are used. The frames are connected to a telephone by means of a potentiometer.

Claim allowed - 1.

523. ERTEL, A. M. (U.S.S.R.). (Magnetic Variometer). Russian Patent 126221, issued February 1934.

This invention relates to a magnetic variometer in which the effect of the magnetic field is increased by using iron rods fixed at both sides of the movable magnetic system of the variometer, the direction of the axis of the rods being along one straight line.

Claims allowed - 2.

524. KUZNETZOV, P. P. (U.S.S.R.). (Magnetic Method of Prospecting). Russian Patent 113853, issued Jan. 1934.

This invention is characterized by the method in which the horizontal component of the field produced by the ore deposit is determined by directing the compensation magnet along the normal magnetic meridian as known from the orientation of the laying out of the network, then the compensation magnet is adjusted to the reading corresponding to the compensation of the horizontal component of the normal earth's field; after this the direction of the horizontal component is determined from the position of the magnetic system of the instrument which automatically comes to rest in the direction of the effect of the deposit; for the determination of the value of the horizontal component the compensation magnet is adjusted to the direction found for this component and the magnet is then moved until the magnetic system comes to rest in the direction of the normal meridian, that is, to the direction which the compensation magnet had occupied when the direction of the horizontal component was searched; the value of the horizontal component is determined from the displacement of the magnet.

Claim allowed - 1.

525. PAVLINOV, V. (U.S.S.R.). (Method of Measuring the Coefficient of the Magnetic Permeability of Rocks). Russian Patent 113000, issued June 30, 1933.

Covers method of measuring coefficient of magnetic permeability of rocks in which two hollow spheres or ellipsoids, having centers in horizontal plane, are used; spheres are filled with rock to be investigated and a magnetic needle is fastened between them. Spheres are turned around needle, and deviation of needle caused thereby is observed. From these observations coefficient of magnetic permeability of rocks investigated is calculated.

Claim allowed - 1.

3. Seismic Methods

526. GAMBURTZEFF, G. A. (U.S.S.R.). (Seismograph with Elastically Mounted Movable Mass). Russian Patent 107489, issued July 1934.

This invention relates to a seismograph provided with an arrangement in which a filament is fixed in front of the opening of a case inside of which the movable mass is mounted elastically. The recording of the oscillations of the ground is achieved by means of the change in the resistance of the filament owing to its cooling by the air forced out of the opening by the mass.

Claim allowed - 1.

527. KONSTATTINOV, A. P. (U.S.S.R.). (Electrical Seismograph). Russian Patent 105846, issued July 31, 1933.

Relates to electrical seismograph consisting of a generator and a resonance body. Capacity of latter is so arranged that it can be changed by effects of shocks.

Claim allowed - 1.

528. POLONSKY, G. M., AND LESHCHINSKY, V. G. (U.S.S.R.). (Seismograph). Russian Patent 15527, issued May 31, 1930.

Uses Rochelle salt plate fastened in an isolated holder and connected by one end with net of an amplifying lamp and by other end with ground and one pole of battery producing glowing of lamp, in anode circuit of which an electric recording apparatus is inserted.

Claim allowed - 1.

529. VOIUTSKY, V. S. (U.S.S.R.). (Method of Measuring the Velocity of Propagation of Elastic Waves in Solid Mediums). Russian Patent 40597, issued Dec. 31, 1934.

This invention relates to the method of measuring the velocity of propagation of elastic waves in solid mediums by means of electrical schemes of measuring small intervals with ballistic galvanometer, electrostatic voltmeter, and others in which the disconnection of the electrical contacts is made by the propagating elastic wave itself by means of contact seismographs; the oscillations of the contacts following the first disconnection are removed by the additional disconnection of the electrical circuit of the seismographs by means of quick-action relays.

Claim allowed - 1.

530. _____(Apparatus for Seismic Prospecting). Russian Patent 42640, issued Apr. 30, 1935. (Title only).

531. YURIN, G. S. (U.S.S.R.). (Seismograph). Russian Patent 26812, issued June 30, 1932.

This invention relates to a seismograph in which the recording on photographic paper is made from a source of light secured in a vibrating device. This device consists of a paramagnetic cap having a hole in its front wall. The cap is connected to the body of seismograph by wire and is kept in suspended position by a magnet.

4. Electrical Methods

532. ALPIN, A. M. (U.S.S.R.). (Apparatus for Geophysical Prospecting by Means of Alternating Current). Russian Patent 127758, issued February 1934.

This invention relates to an apparatus for geophysical prospecting with the aid of which the distortion of the field between the grounded electrodes fed by alternating current is removed. The apparatus consists of a metallic frame with a closed circuit which is not connected either to the source of the current or to the measuring instruments and is buried into the ground between the electrodes.

Claims allowed - 2.

533. _____(Electrical Method of Prospecting). Russian Patent 42220, issued Mar. 1935.

The invention relates to the electrical method of prospecting for deposit in which the two point electrodes between which the field is investigated are connected with the same terminal of the generator.

Claim allowed - 1.

534. ALPIN, L. M. (U.S.S.R.). (Electrical Coring). Russian Patent 43094, issued May 31, 1935.

This invention relates to the method of electrical coring in which the variations of the electrical conductivity are determined by the potential differences at points situated symmetrically with regard to the feeding electrode inside of the hole. The borders of the layers are determined from the return point on the variation curve.

535. _____(Method of Geophysical Prospecting). Russian Patent 43463, issued June 30, 1935.

This invention relates to the method of geophysical prospecting by determining the resistance of the ground between earthings. The method is characterized by the application of two pairs of electrode-probes placed along one straight line, each pair being connected with a separate source of direct current; between these electrodes, probes connected with a compensator are placed.

536. CHERNISHEV, A. A., (U.S.S.R.). (Electrical Method of Prospecting). Russian Patent 40469, issued Dec. 31, 1934.

This invention relates to a method of electrical prospecting in which the rapidity of the increase and decrease of the direct current is determined by an oscillograph, connected between two points on the surface of the ground, at the moments of the connection and disconnection of a constant electromotive force; the electromotive force induced by the current in the adjacent closed electrical circuits is determined also.

Claim allowed - 1.

537. GANDLER, D. L. (U.S.S.R.). (Method and Apparatus for Prospecting for Ore). Russian Patent 17521, issued Sept. 30, 1930.

Relates to method and apparatus for prospecting for ore. Conclusions on velocity of propagation of electromagnetic waves are drawn from amplitude of wave reflected from surface separating each two adjoining nonconducting layers. From this velocity of propagation physical and chemical properties of rocks are determined.

Claims allowed - 3.

538. KOROVIN, K. K. (U.S.S.R.). (Induction Method of Prospecting for Ore). Russian Patent 97459, issued November 1933.

This invention relates to the induction method of prospecting for ore in which the same routes are made twice: Once by working with short waves and the second time by working with long waves. The purpose is that in case of the existence of ore the maximum angular displacements of the receiving frame coincide in both cases, that is in working with short waves and long waves.

Claim allowed - 1.

539. LIVSHITS, E. S. (U.S.S.R.). (Apparatus for Measuring the Distribution of the Potential in the Ground in Prospecting for Ore). Russian Patent 92192, issued July 1933.

This invention relates to an arrangement in which a transformer is used for measuring the potential drop between the probe-electrode created during the flow of the alternating current from the generator through the probes and the ground; the primary winding of the transformer is connected to the generator circuit parallel to the resistance and the secondary winding is connected to the potentiometer from the movable contacts of which the voltage necessary for compensating the measured potential drop is taken.
Claims allowed - 3.

540. SELESNEV, A. P. (U.S.S.R.). (Prospecting for Ores and Conducting Bodies by the Induction Method). Russian Patent 90260, issued July 31, 1933.

Covers electrical prospecting for ores by induction method. Is characterized by an apparatus minimizing effect produced by generator frame upon receiving frame. Additional frame in which working wave is incited is fastened between them.
Claim allowed - 1.

541. SHPARBERG, B. I. (U.S.S.R.). (Prospecting for Ore by the Method of Measuring the Magnetic Fields of Alternating Currents Produced in the Earth). Russian Patent 105017, issued Apr. 30, 1933.

Refers to prospecting for ore by measurement of magnetic fields, using a frame which takes a vertical position automatically. In method described frame is provided with a device recording strength of current. Device is brought in uninterrupted rotation around vertical axis, and points of maximum amplitudes registered at various points of observation are connected. From curve obtained in this way conclusions on properties of magnetic field are drawn.
Claim allowed - 1.

5. Radioactive Methods

542. BOGOIAVLENSKY, L. N. (U.S.S.R.). (Method of Contouring Ore Deposits). Russian Patent 12953, issued Jan. 31, 1930.

Includes following procedure: At points of net plotted on terrane, "half-value period" of decay of any radioactive matter is determined, then points with equal values of these points are connected by curves; based on form of curves having equal "half-value periods" of decay, contour of ore deposit by which change of half-value period of decay is caused is drawn on a plane.
Claim allowed - 1.

543. _____(Apparatus for Measuring the Number of Ions of Different Movement and Different Surface in Atmospheric Air. Russian Patent 41738, issued Feb. 28, 1935. (Title only).

544. SUMGIN, M. J. (U.S.S.R.). (Apparatus for Testing the Radioactivity of Rocks). Russian Patent 16787, issued Sept. 30, 1930.

Consists of hollow cylinder in lower end of which a movable bottom of form of a truncated cone, turned with its top downward, is inserted; walls of this cone are covered with a thin layer of zinc sulphide or platinocyanide barium; bottom has an opening in which a plate assigned for carrying sample of rock to be investigated is inserted; upper end of cylinder has a cover with a microscope serving for observation.

Claim allowed - 1.

545. TARKHOV, A. G. (U.S.S.R.). (Method of Prospecting for Ore). Russian Patent 17515, issued Sept. 30, 1930.

The method described in this patent in which heterodine is used, based on its property of changing one of its contours under the influence of ore deposits, is characterized by an arrangement such that the antenna connected with one of the contours of the heterodine is placed inside of a metallic screen, the latter being provided with a slot. In adjusting the apparatus the slot is covered with a metallic plate. The screen can be rotated by means of a device operated by hand. After the adjustment of the apparatus for the investigation of the ground (disappearing of sound in the telephone) the slot is opened and the screen rotated. The appearance of a sound in the telephone shows that in the direction of the slot there is an ore deposit.

Claims allowed - 2.

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